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THE TREATMENT OF EARLY SYPHILIS BY A FIVE-WEEK PENICILLIN- MAPHARSEN-BISMUTH SCHEDULE*

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THE hope of finding a rapid cure for early syphilis was again envisioned after the publication in 1943 of the preliminary report of Mahoney and his associates dealing with the penicillin treatment of this infection. Since then numerous schedules of treatment have been tried and abandoned, while others have been kept with various modifications. It must be emphasized that all these are only in the experimental stage and are revised frequently. It will require a larger number of patients (several thousands) followed after termination of treatment during many years (a minimum of five years) to obtain a final evaluation of the efficacy of the drug and of its best mode of administration.

It is to be pointed out by the way that a physician treating a case of syphilis with penicillin has the responsibility of a prolonged post-treatment observation.

A preliminary evaluation is possible in early syphilis. It has been found that penicillin can be compared advantageously with other drugs in its action on the disappearance time of the *Treponema pallidum* from superficial lesions, the rapidity of healing of these lesions, and the serologic response. Its high value in the treatment of prenatal syphilis is also established. Among the other details of valuable information accumulated are those regarding routes of administration, total dosage, intervals between doses, length of treatment, advantages of associating chemotherapy. The association of penicillin and chemotherapy has led again to many schemes of treatment. None of them has

given yet the final answer as to which is the best method.

This is a preliminary report on a schedule of treatment which has been tried for the last 30 months on 230 patients, in the Department of Dermatology and Syphilology, Notre-Dame Hospital, Montreal.

TECHNIQUE OF TREATMENT

Treatment consists in the administration of penicillin, mapharsen and bismuth over a period of five weeks, necessitating hospitalization for the first week. During the first week, the three drugs are used simultaneously. During the four other weeks only mapharsen and bismuth are given.

TABLE I.
SCHEDULE OF TREATMENT

	Penicillin	Mapharsen	Bismuth
1st week	2,400,000u	4 x 0.06	2 x 0.07
2nd week .....	..	4 x 0.06	2 x 0.07
3rd week .....	..	4 x 0.06	2 x 0.07
4th week .....	..	4 x 0.06	2 x 0.07
5th week .....	..	4 x 0.06	2 x 0.07
Total	2,400,000u	1,200 mgm.	700 mgm.

Sodium penicillin in aqueous solution is administered intramuscularly every three hours, in 60 injections of 40,000 units each. A total dosage of 2,400,000 units is thus received in 7½ days. Mapharsen is given at the rate of four injections of 60 mgm. each, every week, for five weeks, the total dosage being 1,200 mgm. in twenty injections. Bismuth, in oil solution (bivatol), containing 0.07 gm. of metallic bismuth per c.c., is administered at the rate of one c.c. twice a week, for five weeks.

This total dosage of arsenobismuth therapy is higher than in most other schedules of treatment where, in association with penicillin, arsenical and bismuth preparations are usually given in sub-curative doses but in a shorter period of time. This system of treatment was designed in May, 1945, after consideration of expectation of cure, relation of dosage to duration of treatment and margin of safety. As far as the margin of safety is concerned, this was based to

* Read by Albéric Marin at the Annual Meeting of the Royal College of Physicians and Surgeons of Canada, Ottawa, November 29, 1947.

a certain extent on the experience in this clinic. Sixty cases had been treated with daily injections of mapharsen for 30 days, for a total dosage of 1,800 mgm., without any serious reaction.¹ About the same time Goldblatt reported on 107 patients treated by a similar schedule with no adverse reactions.² It was then felt that by spreading 1,200 mgm. of mapharsen over 35 days, the margin of safety would be further increased.

MATERIAL AND METHOD

In May, 1945, this schedule of treatment was adopted for treatment of cases of early syphilis. Up to November, 1947, 230 patients, all white and civilians, were placed under treatment. Of these, 222 (96%) received complete treatment. A total of 201 cases have been kept for final analysis. The 29 others were eliminated because of previous treatment, late syphilis, doubtful diagnosis, delinquency from treatment (only 2). However a woman who died is included in this group of 201, although she did not receive full treatment.

Table II shows the distribution of cases according to sex and age.

TABLE II.
DISTRIBUTION OF CASES ACCORDING TO SEX AND AGE

Age group	Male	Female	Total
14 to 19	7	28	35
20 to 24	39	41	80
25 to 29	24	17	41
30 to 34	9	11	20
35 to 39	9	4	13
40 to 49	9	1	10
50 to 59	2	0	2
Total	99	102	201

In the whole series, males and females are about in equal number. In the age group 14 to 19 there are four times as many women as men. The age group 20 to 24 is by far the largest (40%). From the age of 35 to 60, men are more numerous than women (20 against 5).

Table III shows the distribution of cases according to sex and stage of the disease.

TABLE III.
DISTRIBUTION OF CASES ACCORDING TO SEX AND STAGE OF THE DISEASE

Stage of the disease	Male	Female	Total
Primary seronegative	34	2	36
Primary seropositive	41	14	55
Early secondary (less than 6 months)	21	73	94
Early latent (less than 6 months)	3	13	16
Total	99	102	201

The primary seronegative group forms 18% of the series, which is a larger proportion than what was seen in the past in the clinic. It is to be noted that there are 34 men and only 2 women. The group of early secondary syphilis forms 47% of the series. In this group there are 3½ times more women than men (73 against 21). It may be eventually possible to see more women at an earlier stage of the disease with an intensification of the educational campaign and with more social workers who could locate at an earlier date the female sexual partners of known infected males.

Management.—In all cases of primary syphilis, the clinical diagnosis was confirmed by a positive darkfield examination and by S.T.S. (serologic tests for syphilis). In early secondary syphilis of less than 6 months, the clinical diagnosis was confirmed by S.T.S. and by darkfield examination when possible. In early latent syphilis of less than 6 months, the diagnosis was made by repeated S.T.S., careful medical history, interview of sexual contacts, and, when available, by evidence of previous negative S.T.S. a few months earlier.

Quantitative blood Wassermann tests were performed on all patients. Standard Kahn tests were made but they were not titred.* The cerebrospinal fluid was examined 6 to 12 months after treatment when possible. After completion of treatment, patients were instructed to report every week until seronegative and then once a month if progressing favourably. In some instances, when S.T.S. was not negative 6 months after treatment the patient was treated with the routine arsenobismuth method.

In tables on results of treatment, re-treatment with conventional therapy has not been taken into consideration. Re-treated patients are however tabulated amongst those progressing unfavourably.

Follow-up of patients.—Table IV shows the distribution of cases according to the date of onset of treatment and length of time that the patient has been under observation.

It is noted that of the 170 cases whose treatment was begun prior to May, 1947, 135 or 79% were observed for 6 or more months. This compares favourably with the follow-up performance of well-known clinics. It is felt that

* All serologic tests for syphilis were done at the Provincial Laboratory, Department of Health, Province of Quebec.

this would not have been possible without efficient social service workers. They are in a better position than the physician to take the necessary steps to ensure that all patients continue their treatment regularly and to prevent the less responsible ones from becoming delinquents. Their activities are also responsible for the collection of valuable medical information.

erythema on the 9th day, 7 cases of urticaria and one of angioneurotic oedema which did not delay treatment. A mild form of arsenical dermatitis delayed treatment for a week.

The case of death occurred in a woman, aged 34, weight 140 lb., apparently in good health and was due to encephalopathy. She had received in 13 days, 2,400,000 units of penicillin, six

TABLE IV.
DISTRIBUTION OF CASES ACCORDING TO DATE OF ONSET OF TREATMENT AND
LENGTH OF FOLLOW-UP BY THE SOCIAL SERVICE

Date of onset of treatment	Length of follow-up					Total number of cases
	Less than 6 months	6 to 12 months	12 to 18 months	18 to 24 months	24 to 30 months	
May, 1945 to November, 1945	2	7	5	12	8	34
November, 1945 to May, 1946	3	2	7	19	..	31
May, 1946 to November, 1946	6	19	24	..	..	49
November, 1946 to May, 1947	24	32	..	..	..	56
May, 1947 to November, 1947	31	..	..	..	..	31
Total	66	60	36	31	8	201

Table V shows reactions to treatment which were all minor except one case of encephalopathy with death.

TABLE V.
REACTIONS

	Male	Female	Total
Herxheimer reaction	0	2	2
Primary fever	20	24	44
Secondary fever	4	7	11
Gastro-intestinal disturbances	5	11	16
Nitritoid reaction	0	1	1
Angioneurotic oedema	1	0	1
Urticaria	3	4	7
Erythema of the ninth day	3	0	3
Arsenical dermatitis	0	1	1
Bismuth stomatitis	0	5	5
Encephalopathy with death	0	1	1
Total number of reactions	36	56	92

The minor reactions did not have an appreciable delaying action on the schedule of treatment. There were five cases of a mild form of stomatitis where the last injections of bismuth were postponed. In the 11 cases of secondary fever there was a delay of a few days. The 16 cases of gastro-intestinal disturbances were of a mild nature. Exacerbation of mucocutaneous lesions with fever was seen in two cases and classified as Herxheimer reaction. Cases showing fever within the first 24 hours of treatment were grouped under the heading of primary fever (44 cases). There was one case of mild nitritoid reaction, in midcourse of treatment, in a woman who could complete it with the addition of adrenalin. There were three cases of

injections of mapharsen and three injections of bismuth. She died two days after the last injection of mapharsen and 15 days after the beginning of treatment. During treatment she did not have primary or secondary fever, nausea, vomiting, headache, or dizziness.

The results of treatment of seronegative primary syphilis are shown in Table VI.

TABLE VI.
RESULT OF TREATMENT IN SERONEGATIVE
PRIMARY SYPHILIS

Number of cases in which the S.T.S. remained negative throughout the whole observation period	31
Number of cases in which the S.T.S. became temporarily positive or doubtful during or after treatment and subsequently became negative	5
Number of serologic relapses	0
Number of clinical relapses	0
Number of neuro-recurrences	0
Total number of cases treated	36
Percentage of successful results	100%

NOTE—Of the 36 cases, 27 (75%) were under observation for 6 or more months and 17 (47%) for 12 or more months.

There were 36 patients in this group. In 31 of these, or 86%, S.T.S. remained negative throughout the whole observation period. In the other 5 patients, S.T.S. became temporarily positive or doubtful during or after treatment and subsequently became and remained negative. In three of these S.T.S. were still negative after 12 months of observation and in the other two the tests were still negative after 18 months

of observation. There was no case of serologic relapse nor of clinical relapse in this group.

Table VII shows the result of treatment in seropositive primary syphilis according to the length of the observation period.

S.T.S. became negative in 41 (74%) of the 55 cases in this group. In all 41 cases the tests became negative in less than 6 months. They have remained negative in 32 (86%) of the 37

patients who were observed 12 or more months. S.T.S. became doubtful in 9 patients, 8 of whom have been observed less than 6 months, the other having been observed 18 months. Two patients, with less than 12 months of observation still had a positive S.T.S.

There was no case of serologic relapse without clinical signs. There was one case of clinical relapse with positive S.T.S., 5 months after

TABLE VII.
RESULT OF TREATMENT ACCORDING TO LENGTH OF FOLLOW-UP
SEROPOSITIVE PRIMARY SYPHILIS

Outcome	Number of months of follow-up										Total	
	1 to 6		6 to 12		12 to 18		18 to 24		24 to 30			
	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%		
Becoming and remain- ing S.T.S. negative .	9	50	17	94	10	100	4	50	1	100	41	74
Becoming and remain- ing S.T.S. doubtful .	8	44	..	..	..	..	1	12	..	..	9	16
S.T.S. still positive ...	1	5	1	5	..	..	..	..	..	..	2	3
Serologic relapse ....	..	..	..	..	..	..	..	..	..	..	..	..
Clinical relapse .....	..	..	..	..	..	..	1	12	..	..	1	2
Possible reinfection ..	..	..	..	..	..	..	1	12	..	..	1	2
Neuro-recurrence ....	..	..	..	..	..	..	1	12	..	..	1	2
Total	18	100	18	100	10	100	8	100	1	100	55	100

NOTE—This table does not indicate the time at which the outcome was achieved. It shows the number of cases and the time at which the outcome was last observed.

TABLE VIII.
RESULT OF TREATMENT ACCORDING TO LENGTH OF FOLLOW-UP
(a) EARLY SECONDARY SYPHILIS

Outcome	Number of months of follow-up										Total	
	1 to 6		6 to 12		12 to 18		18 to 24		24 to 30			
	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%
Becoming and remain- ing S.T.S. negative .	5	16	25	86	10	83	16	88	3	60	59	62
Becoming and remain- ing S.T.S. doubtful .	19	63	1	3	2	16	1	5	..	..	23	24
S.T.S. still positive ...	6	20	2	6	..	..	1	5	1	20	10	20
Serologic relapse ....	..	..	..	..	..	..	..	..	1	20	1	1
Clinical relapse .....	..	..	..	..	..	..	..	..	..	..	..	..
Neuro-recurrence ....	..	..	1	3	..	..	..	..	..	..	1	1
Total	30	100	29	100	12	100	18	100	5	100	94	100

NOTE—This table does not indicate the time at which the outcome was achieved. It shows the number of cases and the time at which the outcome was last observed.

(b) EARLY LATENT SYPHILIS

Outcome	Number of cases	
Becoming and remaining S.T.S. negative	8	50
Becoming and remaining S.T.S. doubtful	4	25
S.T.S. still positive	2	12
Serologic relapse	1	6
Fatality	1	6
Total	16	100

treatment. There was one case of possible re-infection, 3 months after treatment, the patient presenting himself with a single darkfield positive penile lesion at a site different from his initial lesion. His S.T.S. which had become doubtful, subsequently became positive. His wife was then examined and found to have secondary syphilis. This case is counted as a treatment failure in accordance with the practice of other workers in the field of intensive therapy for early syphilis. There was one case of neuro-recurrence without clinical signs, 6 months after treatment. These three cases of definite failures to treatment occurred among patients who were under observation for 18 to 24 months.

Table VIII shows the result of treatment of secondary syphilis according to the length of the observation period.

S.T.S. became negative in 59 (62%) of the 94 patients in this group. In 57 of these S.T.S.

8, became doubtful in 4 and showed no change in 2. There was one case of serologic relapse 7 months after treatment. The other patient was the case of fatality to which reference was made in a previous paragraph.

Cerebrospinal fluids after treatment.—In only 3 of the 96 patients whose cerebrospinal fluid was examined was any abnormality noted. There were 2 cases of asymptomatic neurorecurrences, one in the group of seropositive primary syphilis and the other in the group of secondary syphilis. In the first case the cerebrospinal fluid abnormalities were of group III, and in the second the abnormalities were of group II according to Moore's classification. The case of fatality, who died of encephalopathy, had group II abnormalities of the spinal fluid. Of the patients who were under observation for 6 or more months, 21 (77%) of 27 cases of seronegative primary syphilis, 26 (70%) of 37 cases of seropositive

TABLE IX.
CUMULATIVE TREATMENT RESULTS
135 CASES FOLLOWED-UP 6 OR MORE MONTHS

Outcome	—Number of months of follow-up—							
	6 or more		12 or more		18 or more		24 or more	
	Number of cases	%	Number of cases	%	Number of cases	%	Number of cases	%
Becoming and/or remaining S.T.S. negative .	116	85.0	62	82.0	30	76.0	6	75.0
Becoming and remaining S.T.S. doubtful ...	8	5.0	7	9.0	3	7.0	..	..
S.T.S. still positive	5	3.0	2	2.0	2	5.0	1	12.0
Serologic relapses	2	1.5	1	1.3	1	2.5	1	12.0
Clinical relapse	1	0.7	1	1.3	1	2.5	..	..
Possible reinfection	1	0.7	1	1.3	1	2.5	..	..
Neuro-recurrences	2	1.5	1	1.3	1	2.5	..	..
Total	135	100	75	100	39	100	8	100

became negative in less than 6 months and in the other two in less than 9 months. S.T.S. have remained negative in 54 (84%) of the 64 patients who were observed 12 or more months. S.T.S. became doubtful in 23 cases, of which 19 were observed less than 6 months and 4 were observed from 6 to 24 months. Ten patients still had positive S.T.S. Two of these can be considered as seroresistant since they were observed more than 12 months. There was one case of serologic relapse without clinical signs 5 months after treatment. There was no cause of clinical relapse nor of possible reinfection. There was one case of neurorecurrence without clinical signs, 10 months after treatment.

Early latent syphilis.—There were only 16 cases of early latent syphilis of less than 6 months' duration. S.T.S. became negative in

primary syphilis, 40 (62%) of 64 cases of secondary syphilis and 6 (36%) of 16 cases of early latent syphilis had a normal cerebrospinal fluid.

Table IX shows the cumulative results of treatment in the 135 cases of all diagnosis who have been followed-up for 6 or more months.

It is noted that 85% of the cases had seronegative tests after 6 months, 82% after 12 months, 76% after 18 months and 75% after 24 months. The percentage of patients with seropositive tests increases from 3% after 6 months to 12% after 24 months. Also the percentage of definite treatment failures increases from 4% after 6 months to 12% after 24 months. It would therefore appear that with the passage of time the treatment results become less satisfactory. However the number of cases followed-up for 18 months and more is rather small (39)

and these percentages may not be altogether significant.

Table X shows the summary of the results of treatment.

(a) *Satisfactory progress.*—All cases of seronegative primary syphilis were still seronegative at the time of last examination, a satisfactory result in 100% of cases. In seropositive primary syphilis, S.T.S. had become and remained negative in 74% of the patients and doubtful in 16%, for a total of 90% of satisfactory progress. In secondary syphilis, 86% of the patients were progressing favourably. The overall results show 72% of seronegativity and an additional 18% of doubtful serology for a total of 90% of satisfactory progress.

(b) *Treatment failures.*—The definite failures from treatment included one case of clinical

with the 20 day intensive arsenobismuth system (1,200 mgm. mapharsen and 8 injections of bismuth subsalicylate). Steinberg and Leifer³ reporting on the results of treatment of early syphilis with penicillin alone, with an observation period of more than 9 months in over 80% of the cases, obtained satisfactory progress in 94% of the primary seronegative cases, in 89% of primary seropositive cases, and in 83% of early secondary. Pillsbury⁴ reporting on the results in early syphilis treated by the twenty-day system, with an observation period of 12 months, found a negative S.T.S. in 97% of the primary seronegative syphilis, in 93% of primary seropositive, in 95% of secondary syphilis.

With the five-week treatment reported in this paper, of the patients followed-up for 6 months or more, S.T.S. was negative in 100%

TABLE X.
RESULT OF TREATMENT—SUMMARY

	<i>Seronegative primary syphilis</i>		<i>Seropositive primary syphilis</i>		<i>Secondary syphilis</i>		<i>Early latent syphilis</i>		<i>All cases</i>	
	<i>Number of cases</i>		<i>Number of cases</i>		<i>Number of cases</i>		<i>Number of cases</i>		<i>Number of cases</i>	
		%		%		%		%		%
S.T.S. negative	36	100	41	74	59	62	8	50	144	72.0
S.T.S. doubtful .....	..	..	9	16	23	24	4	25	36	18.0
S.T.S. positive .....	..	..	2	3	10	10	2	12	14	7.0
Serologic relapses .....	..	..	..	..	1	1	1	6	2	1.0
Clinical relapses .....	..	..	1	2	..	..	..	..	1	0.5
Possible reinfection .....	..	..	1	2	..	..	..	..	1	0.5
Neuro-recurrence .....	..	..	1	2	1	1	..	..	2	1.0
Fatality .....	..	..	..	..	..	..	1	6	1	0.5
Total	36	100	55	100	94	100	16	100	201	100

relapse with positive S.T.S., one case of possible reinfection, two cases of serologic relapses without clinical signs, cases of neurorecurrences, two cases of seroresistance after one year and one case of fatality, a total of 9 cases (4.5%).

(c) *Results pending.*—The other 12 patients still had a positive serologic test at the time of last examination. Half of these were cases of secondary syphilis who have been under observation for less than 6 months. Some of the others were given retreatment after only 6 months of follow-up and it will not be easy to determine whether they will have to be considered as failures or not.

COMMENT

The five-week treatment reported in this paper may be compared with the treatment by penicillin alone (2.4 million in 7½ days) and

of cases of primary seronegative, in 86% of primary seropositive, in 84% of secondary syphilis. It would appear that the results obtained by the 20-day system are superior and that the results of the treatment by penicillin alone are about equal to those obtained with the five-week schedule. The results of the five-week schedule may be improved later when a larger number of patients will have been treated and followed-up.

There was one case of death, the 162nd case, who died after having received 360 mgm. of mapharsen in 13 days. Apart from this there was not a single severe toxic reaction.

The toxicity of a scheme of treatment is measured by the incidence of severe toxic reactions, accompanied or not by death. Heller⁵ reported one death and over 30 severe toxic reactions per 4,312 patients treated with penicillin

combined with small amounts of mapharsen and bismuth. It rather seems that in the five-week system it was an unfortunate hazard that the only case of severe toxic reaction was a fatality and therefore it was felt that the continuation of this method of therapy was justifiable.

SUMMARY

1. This is a preliminary report on 201 cases of early syphilis treated by a five-week penicillin-mapharsen-bismuth schedule.

2. Of 230 patients who started on this schedule, 96% received the complete treatment. Twenty-nine were not considered in this study mainly because they were not definitely cases of early syphilis.

3. It has been possible to keep under observation for 6 or more months 79% of the patients treated prior to May, 1947.

4. There was one fatality due to encephalopathy (0.4%) and there were no other severe toxic reactions.

5. Satisfactory progress was obtained in 100% of 36 cases of seronegative primary syphilis, in 90% of 55 cases of seropositive primary syphilis, and in 86% of 94 cases of secondary syphilis.

6. The overall results show 90% of satisfactory progress and 4.5% of definite treatment failures, with the other 6% pending. If results obtained so far are maintained, the five-week schedule will compare favourably with other adequate treatment methods for early syphilis.

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RÉSUMÉ

Rapport préliminaire des résultats obtenus chez 201 malades atteints de syphilis précoce et traités par l'association P.M.B. en séries conjuguées pendant 5 semaines. Sur 230 malades inscrits au début, 90% reçurent le traitement complet. 29 ont été rayés de la série parce qu'ils ne répondaient pas exactement à la définition de syphilis précoce. 76% des malades traités avant mai 1947 ont été suivis pendant 6 mois et davantage. On n'a relevé qu'une seule mortalité, par encéphalite, soit 0.4% du total. Par ailleurs on ne nota aucune réaction sérieuse.

Des résultats excellents ont été relevés dans 100% des 36 cas de syphilis primaire séro-négative, dans 90% des 55 cas de syphilis primaire séro-positif, et dans 86% des 94 cas de syphilis secondaire. Dans l'ensemble 90% ont eu des résultats satisfaisants et 4.5% furent des échecs; 6% ne sont pas classés définitivement. Si les résultats obtenus persistent, ce traitement de 5 semaines supportera avantageusement la comparaison avec tout autre mode de traitement de la syphilis précoce.

JEAN SAUCIER

THE PROBLEM OF THE OLDER AGE HERNIA

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IN a recent summary and subsequent survey of 522 herniotomies of all types representing the surgical repairs done on the Surgical Service of Shaughnessy Hospital during the period from October 1, 1945 to September 30, 1947, an effort was made to break down and tabulate the results in a variety of ways. In so doing, some interesting figures presented themselves in respect to the various age groups. We immediately became interested in the older age group, namely 60 years and older, and of the total number of 552, it was noted that 50 came into this age group, a percentage of 9.05.

The youngest was naturally 60, the oldest 87—giving an average age of 64.

Types of hernia

Indirect inguinal	18
Direct inguinal	26
Direct and indirect	4
Strangulated	1
Incarcerated	3
Bilateral	5
Recurrent	4
Femoral	2
Strangulated	2

Types of repair

Halstead	22
Bassini	19
Ferguson	2
McArthur	2
Henry	2
Simple ligation of sac	1
La Rocque	1
Mattson	1

Suture material

Steel	39
Silk	6
Fascia	2
No repair	3

Ambulation started postoperatively

Shortest	1
Longest	14
Average	1.9

Postoperative days—hospital

Shortest	9
Longest	29
Average	14.4

Total postoperative treatment days

Shortest	10
Longest	55
Average	30.4

Postoperative complications

Wound infection	3
Mild and did not affect postoperative course.	
Spinal headache	1
Hæmatoma	1
Pulmonary	1
Ilio-inguinal causalgia	1
Recurrence	1

Percentage of cases showing complications 16.2

The postoperative complications in all the age groups were essentially the same. In no cases were the complications of such a nature that they in any way interfered with the ultimate postoperative course.

The various percentages in all the age groups were as follows:

Age	Percentage
19 to 29	13.4
30 to 39	13.6
40 to 49	18.8
50 to 59	20.4
60 to 69	16.2
70 to 79	0
80 to	0

It will be seen from the above figures that the age group which contributed the greatest

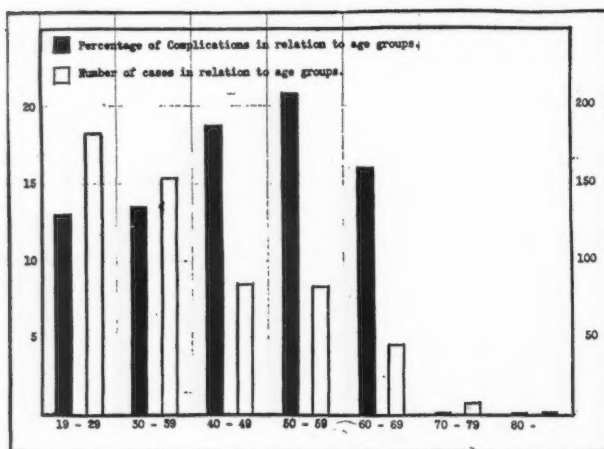


Chart 1

number of complications was 50 to 59; also that the older age group complications compare very favourably with those in the younger age groups.

Until quite recently this old age group presented a very contentious problem. We believe it to be true that most surgeons, except in cases of strangulation and incarceration, considered it ill advised surgery to subject their patients in the old age group to surgical repair of hernia. It is quite probable that the success achieved in surgery upon these emergency types of cases convinced us that possibly the risk of surgery in the older age group was not as great as had

been thought. A survey of the literature over the past 8 years, reveals that in spite of the volumes that have been written on hernia only one article dealing with this aspect of the subject was found.

F. Merke¹ makes the following interesting observations: (1) That in any given locality, the population is having an increased life expectancy. In Basle in 1900—7,125 were over the age of 60. In 1940 the number was 14,222. Hence he suggests that the incidence of surgery in this age group is increasing and that in St. Clara Hospital, Basle, the percentage of surgery in this age group rose from 9.4 to 13.2% between 1929 and 1941. (2) In a series of 102 simple hernia, there was one death—10 days postoperative from gastro-intestinal hæmorrhage with a diagnosis of mesenteric thrombosis. (3) In a series of 53 cases operated upon for strangulated hernia the mortality was 11.3%. He suggests that as a certain number of hernias with frequent incarcerations are almost certain to become strangulated, it is advisable to resort to early surgery. (4) He stresses the necessity for adequate preoperative preparation and postoperative treatment. He advises early ambulation and suggests either spinal or local anæsthesia.

Finally he makes a plea that the general practitioner should be acquainted with the fact that with present day methods, these cases of repeated incarcerations can now be treated surgically with very little more risk than the younger age groups.

In the past, the older age group were not considered surgical risks for a variety of reasons. (1) The tissues were not considered good material for a satisfactory repair. It was considered that the incidence of recurrence would be high. (2) This group often has associated peripheral vascular disease and the possibility of a resultant thrombophlebitis with embolic complications was deemed a contraindication of surgery. (3) Many are subject to chronic pulmonary conditions which might be aggravated by surgery with resultant strain from coughing and recurrence of the hernia. (4) This group often has associated genito-urinary complications and it has been suggested that recurrence can be caused by the added strain of prostatic disease.

Yet in spite of these objections, the pendulum has undoubtedly swung in the opposite direction and now because of the various procedures, which will be discussed later, we are able to

undertake surgery in this age group with very little more risk than in the younger age groups and as our figures show the risk incidence of complications and recurrence is no greater; in fact it is less than in some of the other age groups. We have adopted the following criteria as to the operability of these cases. Surgical repair of the hernia in patients in this age group is considered in those: (1) who appear to be in good general physical condition — particularly those who look younger than their stated age; (2) who are productive as far as earning capacity and ability to work are concerned; (3) whose ability to work is handicapped by the necessity of a truss which in some cases will not satisfactorily retain the hernia and in some cases peculiar to our service, namely, the amputation cases, interferes with the apparatus associated with the prosthesis.

In cases where the patient leads a sedentary life, is not required to do heavy manual work and in which the hernia can be retained with a suitable truss, there is no indication to resort to surgery. It is interesting to note that the medical officer in charge of our convalescent hospital at Burnaby, stated that of all patients under him, the most grateful are the old age group herniotomies.

The most common preoperative complications are those concerned with the respiratory tract. If the patient has a chronic cough, as many of the old age group have, adequate measures are instituted to combat any existing condition. In the older age group, the chest condition is a chronic one and we feel that as the condition cannot be completely eliminated, it is better to institute a regimen of treatment which will control the existing condition. To this end, we institute a course of preventive treatment with aerosol penicillin; aminophyllin; ephedrine; penicillin. It is impossible to outline a definite course of treatment, as each case has to be treated on its individual merits. In general, however, our plan is as follows.

Preoperatively we put our patients on an expectorant mixture using potassium iodide. We use aerosol penicillin with an oxygen tank, the apparatus being beside the bed and is used periodically during the waking hours. Aminophyllin gr. 3 t.i.d. Ephedrine gr. $\frac{3}{8}$ t.i.d. We believe aminophyllin to be more satisfactory and much safer as a vasodilator in the older age group. CO₂ inhalation postoperative is also of great

benefit; we use it only for a period of 24 hours. Postoperative breathing exercises and early ambulation are, of course, part of the regimen. Penicillin 50,000 units q.3 h. for 48 hours postoperative is given.

Under this regimen it is very gratifying to observe how these cases can tolerate surgery with little, if any, increase in pre-existing symptoms. If there is any indication of cardiac complications, a thorough examination, including electrocardiographic investigation is carried out.

A routine examination of the prostate and urinalysis is carried out and in our series it was found that: 8 complained of nocturia; 2 had positive urinary findings, *i.e.*, sugar, albumen, casts; 8 prostatic enlargement; 7 referred to genito-urinary — no treatment suggested; 1 nephrectomy; 1 prostatectomy; 1 transurethral; 30 normal urinalyses.

Peripheral vascular conditions are often present and can become a frequent complication in the old age group, a recurrence of an old thrombophlebitis or an initial episode in a pre-existing varicose condition. We believe this is best handled by two methods: (a) Early ambulation. This is perhaps the greatest advance in our handling of these cases and has done more to make surgery safe than any other one factor. It stimulates circulation and aids respiration and generally has a preventive beneficial effect in limiting postoperative complications. (b) Stir up regimen. By this we mean a definite regimen carried out by trained physiotherapists who take charge of the case preoperatively and instruct the patient in breathing as well as in muscular exercises, to the end that on their return from the operating room they are able to carry out intelligently the exercises they have previously been instructed to do.

ANÆSTHESIA

We would be remiss not to give all due credit to the part our anæsthetists play in this type of surgery. The recent advances and skill in their department has indeed made a valuable contribution to the success in our handling of these cases. Each case is assessed preoperatively by one of the anæsthetic staff and the best method of anæsthesia to suit the individual case is instituted.

In our series the type of anæsthesia used was as follows: spinal 42; local block 5; cyclopropane 3; cyclopropane and local 1.

We suggest the usual dietary build up, supplemented by multi-vitamins with an added course of vitamin C which is essential to wound healing and so is doubly necessary in this type of patient. A check up in our Dietary Department reveals the fact that our ordinary hospital diet contains 98 to 135 mgm. of vitamin C daily, according to the season of the year—this of course depends on just how much of this given diet the individual patient might take. However, to assure an adequate amount of this vitamin we give a daily oral dose of 200 mgm.

We instituted a follow up of our series and were able to contact 48 of the 50 cases with the following results: 47 were entirely satisfied with the operative result. The one dissatisfied case had a postoperative ilio-inguinal causalgia and is at present under treatment. There was one recurrence 14 months after operation, and one case that had a repair of a left recurrent direct inguinal who has now developed a femoral hernia on the same side. Twenty-seven have returned to work and are gainfully occupied and feel more able to carry on now that the hernia has been repaired and that they are relieved of the necessity of wearing a truss.

Since the completion of this paper we have added a further 12 cases to our operative list, 5 of which were in the 60 to 69 age group; 7 were in the 70 to 79 age group. It is of course too early to assess the ultimate outcome of these cases, but with the exception of one minor incisional infection, we have not had any other immediate postoperative complications.

CONCLUSIONS

We believe surgical repair of hernia in the older age group to be a sound surgical procedure under certain circumstances.

It is definitely indicated in the presence of repeated incarcerations and recurrent strangulations that have been reduced, as the operative risk is nil compared with risk of surgery in the presence of strangulation.

It permits the return to work of cases in which the hernia cannot be controlled by a proper fitting truss.

And finally, in selected cases, the operative risk in the older age groups is no greater than in the younger and the postoperative complications in our series were less than in some of the younger age groups.

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RÉSUMÉ

Lorsque les conditions sont bonnes, le traitement chirurgical de la hernie ne comporte pas de risques particuliers chez les sujets âgés. On ne doit pas hésiter à opérer de tels malades lorsque la hernie emprisonne fréquemment l'intestin et après les étranglements à répétition encore réductibles. Il faut se souvenir que le risque opératoire est moins sérieux que lorsque le chirurgien se trouve en présence d'une hernie étranglée. L'opération permet aux malades porteurs de bandages insuffisants de retourner au travail. Dans certains cas bien choisis, il arrive que les complications post-opératoires soient moins fréquentes que chez les jeunes sujets, du moins, dans la série de malades que nous avons observés.

JEAN SAUCIER

THE PSYCHOLOGY OF RECONSTRUCTIVE SURGERY*

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THERE has been a marked quickening of interest in the problems and offerings of plastic surgery. This has been brought about in large measure by a heightened consciousness of the many patients who have suffered disfigurements by reason of war injuries or industrial accidents in plants running at capacity, 24 hours a day. Such interest has manifested itself in numerous articles and books which have taken the form of surveys, studies and researches to describe new operations, to ascertain the problems of this particular group of patients and their circumstances in life. It has even resulted in the creation, by governments and universities, of special boards, committees and services, to study the facilities for their improvement along medical, surgical, educational and vocational lines.

All this activity, praiseworthy as it undoubtedly is, turns out, on closer analysis, to be but an effort to deal with a physical consequence, rather than the cause of what is a particularly distressing reason for social mal-adjustment. The difficulty of the disfigured person who, by the way, is found in all walks of life, is not primarily a surgical, educational or vocational problem. If it only were, its solution would be a much simpler task than it actually is.

The real difficulty stems from the notorious lack of understanding of certain basic facts concerning the psychology of injured people. In truth, most of us are not aware that such atti-

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tudes as we have formed about disfigured and crippled people have very often been profoundly influenced by ancient misconceptions. So, while it is entirely true that mutilations of hands or face are purely physical handicaps, and that their prevention and amelioration necessitate proper surgical treatment, health and educational measures; it is equally a fact that no satisfactory handling of the problem from a health, educational or vocational standpoint is possible without first removing deep-lying social attitudes; attitudes of which we are not always conscious but which are based on ignorance and its concomitant, prejudice.

These attitudes are the chief obstacle to much needed remedial programs. Once the origin and nature of these misconceptions are better understood, the way will be cleared to the correction of the negligence and mistakes of the past. This eradication is certainly a requisite to an effective solution of the problem presented by any seriously and permanently injured individual.

But, first we must squarely face the issue and be ready to admit that which may seem disagreeable and unpleasant. If we are prepared to confront it candidly and intelligently we will recognize that the most important misconception is the indisputably widespread emotional feeling that scars are horrible. This is putting it in a comparatively mild form. For there is in the minds of many persons a definite association of disfigurement and revulsion. The truth of this statement could be illustrated by many instances drawn from everyday life. We might cite the case of a doctor's child who became frenzied almost to hysteria by the sight of any malformation and who had to be smuggled out by the back door rather than walk past a man who had lost a leg; although that leg had been lost in defence of the very democracy in which that child was privileged to live. The origin of the revulsion was not clear but it must have been planted by adult associates since such reaction is not innate.

How profoundly the conscious or unconscious association of mutilation and horror colours our thoughts and actions can hardly be estimated, but not many will dispute its enormous influence. People who are badly adjusted to their disfigurements are constantly suffering from a feeling that others whom they meet are concentrating on the disability, rather than on what the person may have to say. Because they, the patients,

may become suspicious or self-conscious, the average man feels uncomfortable in their presence. The effort to be polite and avoid focussing on the scar may engender irritation and vexation, and the simplest way in the world to get rid of an uncomfortable situation is to steer clear of it. Thus we wash our hands of the unfortunate person who suffers from a disability and avoid social contact with him as far as possible.

To my mind this characteristic human reaction is at the bottom of the whole problem, and always has been. As the individual reacts when faced with this problem, so society has reacted. This basic proposition is beyond dispute. From this fallacy as to the relation between physical appearances and personality spring the coldness, indifference, and even hostility which have often characterized and still characterize the attitude of society.

Our attitudes and reactions reflect the attitudes of society concerning disfigurements in all ages. The attitude, however, has not been static. In several important respects the changes have been great, so much so that it represents a real revision of some of our fundamental concepts, but the revision is still all too limited. An enlightened staff or university by no means always signifies a generally enlightened public. Research and study are very often merely expressive of the recognition in certain informed quarters that a problem exists; they do not signify any widespread understanding on the part of society of the historic background, meaning, and purpose of the plan of care which may have been involved. After the introduction of any new principle in treatment it is often necessary to educate the broad mass as to its significance and purpose. This the medical profession notoriously fails to do. In the meanwhile, much of the ignorance, superstition and prejudice of the past lingers on and continues to exercise a deep influence on our ways of thinking.

In an enlightened age the application of any ordinary intelligent thought convinces us that the individual who has been scarred is the same individual, mentally and emotionally, as he was before. As Antoine de St.-Exupéry so vividly declares "It is not those lips that we love, but their glance; not the flesh, but a downy spirit, a spark, the impalpable soul that inhabits the flesh".

But it is easy to give many instances of the persistence and survival of those very presump-

tions and the ideas which inspired them: only nowadays they assume different forms and guises, while occasionally they even find expression in all their unadorned mediæval crudity. Thus, we hear of the wife who was unable to endure the sight of her husband's battle-scarred face and hands, and who finally left him, although protesting that she still loved him. He was the same personality and soul that he had been when he was married, but she was in love with and had married a good looking tailor's dummy, not the man who inhabited the frame, and when the features were marred she had nothing left. Perhaps he was as well off without her!

How much more fortunate was the lad in the military hospital undergoing a series of plastic operations. This boy refused to go on to his home but preferred the understanding shelter of the hospital group because, as is so often the case, the skill of the plastic surgeons still left much to be desired. His family, tired of waiting, took the long trip East and were ushered to the ward. As his sister caught sight of her long awaited brother, she broke from the guide and rushed down the ward crying "Oh, there's Jimmie"! and flung herself into his arms. He needed no further treatment. Her spontaneous cry had reassured him he was still Jimmie, scars or no scars. How right she was!

Scars obtained in honest toil, or in battle for a righteous cause are not dishonourable. In fact, the very opposite is the case. They are, and should be regarded as, a badge of honour. Soldiers returned from war are permitted to put up wound stripes, which are significantly coloured—golden. These are highly regarded by the man himself and by all whom he may meet, as an evidence of courage and faithfulness. The scars themselves are even more authentic evidence of wounds valiantly suffered, than are the golden wound stripes on the sleeve of a tunic. No need to hide them—nor should they be flaunted. To paraphrase Joseph C. Grew, one time Undersecretary of State in the United States Government, "We should take care neither to whisper, nor to shout about them".

The selfish aversion with which the mass of people regard disfigurement is indeed a discouraging prospect but it is by no means hopeless. A moment's consideration is all that is needed to remind any of us that the people can actually be taught to regard scars with envy and admira-

tion. In fact, such is the primitive and natural tendency. The modern shudder is artificial.

In Germany within the present generation, college youths and members of the famed *Farbentragendenverbindungen* were wont to exalt the ancient glory of duelling. Proud indeed was the man who could show a great vivid scar across his forehead or down one cheek even though everyone knew that the sabre slash had been received in the thoroughly needless and puerile pastime of defending the honour of some now unknown organization of young "super-men". The width and extent of these scars, of which we have seen many, make it quite evident to any medical man that they have not been sutured, but rather have been allowed to heal by secondary union. Clear proof that the bearer wished his scar to be as noticeable as possible, so that he might flaunt it for all to admire. Here was no call for plastic surgery to minimize the mark. Here was no timorous shrinking into the background. Yet the scars were evidence of nothing more glorious than a boyhood folly.

Nor have we need to seek so far as Germany. Right here at home the small boy who delights to strut before his playmates with an unnecessarily large bandage on a small cut is a familiar sight to all parents. The envy of the boys and the fluttering admiration of the budding debutantes is ample proof of the original inborn desire to glorify achievement and to worship the evidence thereof. Yet the trend may be further seen in grown men. The hero of the gridiron who appears with a black eye or wearing a sling at the fraternity tea after the game can be absolutely certain of finding himself the centre of a bevy of gasping beauty, even though the black eye or the broken collar bone may prove only that his tackle was clumsy.

The fundamental principle, then, of the task of helping the seriously handicapped member in the community is based on the realization that the psychological stresses of any plastic problem involve two forces. On the one hand we have the individual with his natural responses to all his circumstances. On the other hand we have the environment with its multitudinous impacts in the individual; impacts which leave their mark at every turn and which produce a predictable, and therefore controllable, response to each new and changing situation. Needless to say, human beings rate large in the environment of the man struggling for rehabilitation. The

attitude of society, his friends, relatives, associates, and even casual contacts influences the response of the man more than is usually appreciated.

Furthermore, one of the most important human beings in the world of the patient is his doctor. The reconstructive surgeon whether he be repairing a mangled hand or improving a scarred face—whether he be striving for restoration of function or appearance—endeavours constantly to keep in the forefront of his consciousness the total personality entrusted to his care. No longer does the expert but unimaginative technician reach the peak in plastic surgery. His ministrations must succeed not only surgically but also psychologically. It is easy to transfer skin from the thigh to the hand or from the arm to the face and to have a 100% take. It is not so easy to restore the patient to his place in the social or economic world. In truth the mere fact that the surgeon has outlined for him a long series of multiple stage operations running into years, tends to convince the tremulous victim that he must be horrible and that he must hide from his fellow man until his kindly benefactor, the surgeon, has made him fit to appear.

The surgeon must ever be able to support his patient until the thinking and feeling of society be moulded to the point where scars of the body even though not exalted as necessary emblems of valour are at least regarded in their proper perspective and are seen to be of little importance in the structure of the real personality.

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RÉSUMÉ

Le chirurgien qui s'occupe de chirurgie plastique doit être, non seulement un expert dans son art, mais aussi un psychologue averti. Il est le mieux placé pour préparer son malade aux éventualités de l'attitude du public. Il faut lutter contre cette habitude qu'ont certains d'associer les cicatrices avec quelque chose d'horrible. Il faut bien savoir que ces cicatrices n'ont pas été voulues et qu'elles sont plus anoblissantes que dégradantes. Le mutilé n'a pas subi de mutilation de sa personnalité. Il faut s'habituer à voir les cicatrices à leur véritable échelle, ou mieux encore, à les ignorer. On n'évalue pas la personnalité par les signes extérieurs. La chirurgie plastique a beaucoup fait mais elle ne peut pas tout restaurer. Notre charité et notre bienveillance devront accomplir aux yeux du mutilé la complète restauration.

JEAN SAUCIER

THE VALUE OF SPLENECTOMY IN HÆMATOLOGICAL DISORDERS

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SPLENECTOMY is now recognized as a valuable therapeutic measure in certain diseases of the blood and blood-forming organs. The veil of mystery enshrouding the spleen is gradually being lifted by hæmatological research. The present concepts of splenic function and the newer methods of diagnosis provide a more rational basis for the operation, while the improvement in surgical technique and care of the patient should lessen its dangers. I shall refer briefly to some of the hæmatological conditions in which splenectomy may be valuable, and give some illustrative case reports.

HÆMOLYTIC ANÆMIA

This large group includes some conditions which are cured or benefited by splenectomy, and others in which the operation is contraindicated. Congenital hæmolytic jaundice, according to Dameshek¹ is probably due to hypersplenism, but whether the spleen exerts only a hæmolytic effect, or also influences the maturation of the red cells and their delivery from the marrow has not been settled. Mild cases may live to an advanced age more or less symptom-free, but in the majority chronic ill-health is the rule, with the ever-present danger of a hæmolytic crisis or some serious complication. Splenectomy is followed by uniformly beneficial and lasting results. Operating during a crisis is risky but may be life-saving. Transfusions may occasion severe reactions. After splenectomy the increased fragility of the red cells and spherocytosis may persist, but the patients are greatly improved in health and the prognosis is excellent.

Acquired hæmolytic jaundice is a more serious condition. Splenectomy may be the only course but the risk is greater than in the congenital type. In the acute form Dameshek and Schwartz² reported it curative in 20 out of 23 cases, and advocated its use when transfusions gave temporary benefit only. In Cooley's anæmia and sickle-cell anæmia the operation may give symptomatic relief and in some instances may retard the progress of the disease. It is contraindicated in the hæmolytic anæmia associated with Hodgkin's disease,

lymphosarcoma or lymphatic leukæmia. Sharpe and Tollman⁵ report the operation a failure in refractory hæmolytic anæmia. Stransky and Regala⁶ found that in atypical familial hæmolytic anæmia splenectomy was followed by erythroblastic anæmia.

CASE 1

H.L.S., male, aged 30. Admitted to hospital in November, 1942, complaining of nausea, vomiting, loss of appetite, tired feeling and jaundice. Family history, negative for any blood dyscrasias, jaundice, etc. Personal history, O.D.C. tonsillectomy, 1932 with two postoperative hæmorrhages. During convalescence he contracted scarlet fever. Present illness: The symptoms began about one week before admission. There was a definite icterus, but no hæmorrhages or purpura. Spleen and liver were not palpable. Remainder of examination was negative. Icterus index 44; Hb. 60%; red blood cells 3,710,000; colour index 0.80; white blood cells 11,700; reticulocytes 17%. Fragility of the red cells increased. Urine, negative. A diagnosis of hæmolytic anæmia was made. Patient recovered from the hæmolytic crisis and during the next two years slight jaundice was present. In 1944 the spleen became palpable and gradually increased in size until 1946 when it was about 3" below the costal margin. The patient suffered considerable abdominal discomfort, nervousness and tendency to fatigue. Icterus index ranged between 30 and 40.

In July, 1947, physical examination revealed a moderate icterus and splenomegaly, but was otherwise negative. Urine was negative for bile. Hb. 80%; red blood cells 4,140,000; white blood cells 11,800; reticulocytes 19%. The red cells showed some achromia, anisocytosis and microspherocytosis, with some polychromatophilia and a few normoblasts. Fragility began at 0.50 and was complete at 0.42. The sternal marrow showed marked increase in activity. Liver function tests, negative. On July 30, the spleen was removed. The patient made an excellent recovery. The jaundice, abdominal discomfort and fatigue soon disappeared. At the present time he feels better than he has for many years. Hb. 102%; red blood cells 5,180,000; white blood cells 10,200; reticulocytes 1%; icterus index 4.

It is difficult to state whether this is a case of congenital or acquired hæmolytic anæmia, but splenectomy was definitely indicated and unquestionably beneficial.

THROMBOCYTOPENIC PURPURA

Dameshek¹ distinguishes four types of this disease. (1) Due to bone marrow disease in which the megakaryocytes are diminished as part of a generalized disturbance, as in aplasia, leukæmia, etc. (2) Due to a selective bone marrow disturbance from toxic, chemical or allergic cause. (3) Due to hypersplenic effects of a splenomegaly. (4) Idiopathic, in which an active substance from the spleen causes an inhibition of growth and delivery of platelets from the megakaryocytes to the blood.

In considering splenectomy for thrombocytopenic purpura it should be borne in mind that the condition may respond to medical measures. Postponement of the operation, however, may be regretted in the event of hæmorrhage into vital structures such as the brain or the eye. The risk of splenectomy may be preferable to

a wait-and-see policy. The chief value of the operation is in the idiopathic type or in those cases secondary to hypersplenism.

CASE 2

Mr. E.C., aged 20 years was admitted to hospital August 22, 1946, on account of injuries sustained in a motor accident the previous day.

Family history, unimportant.

In 1943 he injured his knee and there was a large hæmorrhage into the joint. A few days later he had a severe epistaxis, and one month later hæmorrhage in the left eye. Vision in this eye had remained impaired with occasional diplopia. Since 1943 he had manifested a tendency to bleed easily following trauma. He had numerous epistaxes and attacks of purpura. The last epistaxis was in April, 1946. An appendectomy in 1946 was uncomplicated. Physical examination on admission revealed contusions of the face, head, chest, arms, left thigh and over the sacrum. There were no petechiæ present. Spleen and liver were not palpable. Vision in the left eye was impaired, with muscle imbalance and a mild retinitis. Remainder of examination was negative. X-rays disclosed a linear fracture of the left frontal region without depression.

Urine, normal; Kahn, negative; Hgb. 70%; bleeding time, over 20 minutes; coagulation time, 3½ minutes; prothrombin time, 18 seconds; clot retraction, 24 hours; platelets, 45,100; tourniquet test, positive.

The diagnoses were, fracture of the skull, multiple contusions and thrombocytopenic purpura. Recovery from the accident was satisfactory, no further bleeding occurred and the patient was discharged on September 10 with instructions to return in one month. He was readmitted on October 11. Since leaving hospital he had had no hæmorrhages, but had noticed a few purpuric spots on his limbs. Physical examination revealed a few ecchymoses in the skin. The spleen was not palpable. General physical condition was good.

Urine, normal; Hgb. 75%; red blood cells 3,850,000; white blood cells 10,900. The red cells showed hypochromia, anisocytosis and a predominance of microcytes. No abnormal white cells; juveniles 0; bands 1; seg. polymorphonuclears 49; lymphocytes 45; large monocytes 1; eosinophiles 2; basophiles 2. Blood platelets 19,250; bleeding time over 10 minutes; coagulation time 3½ minutes; clot retraction 20 hours; tourniquet test positive. On October 22 splenectomy by Dr. Kinley. The spleen was large and soft and the splenic veins greatly dilated.

Pathologist's report.—Spleen weighed 370 gm., dark red, soft and congested; no fibrosis or miliary tubercles visible. There were numerous tubercle-like follicles without caseation in the centres of most of the Malpighian bodies. Numerous epithelioid cells and multi-nucleated giant-cells with the reticulum still largely present in them. The diagnosis rests between sarcoidosis and miliary tuberculosis, but I rather favour the former. The spleen otherwise shows congestion of its sinuses, but no excess of megakaryocytes or eosinophiles. There are some polymorphonuclears such as one usually sees in a typical case of thrombocytopenic purpura (Dr. R. P. Smith).

The postoperative course was excellent. On October 29, the blood picture was as follows: Hb. 92%; red blood cells 4,880,000; white blood cells 15,100; juveniles 1; bands 4; seg. polymorphonuclears 75; lymphocytes 16; large monocytes 2; eosinophiles 2; basophiles 0. Plasma proteins 7.8 gm. %; albumin 4.44; globulin 3.36. Volmer patch test and intracutaneous tuberculin test, negative.

The patient was discharged in excellent condition on November 13, 1946. In view of the pathological findings, the high globulin, and the negative evidence of tuberculosis, it was felt that this was a case of sarcoid spleen with secondary thrombocytopenic purpura. There was no other evidence of sarcoidosis. The patient reported on November 7, 1947, that he has been in splendid

health since the operation. He has gained weight and has had only two slight nose-bleeds. Blood picture: Hb. 110%; red blood cells 5,500,000; white blood cells 20,050; platelets 110,000; bleeding time normal; plasma proteins 7.1; albumin 5.4; globulin 1.7.

PRIMARY SPLENIC NEUTROPENIA

This condition was first described by Frank⁷ in 1916 as "Aleukia Splenica". Reissmann⁸ reported the first case of splenic neutropenia associated with splenomegaly and cured by removal of the spleen. Wiseman and Doan⁹ in 1939 reported 3 cases which they designated primary splenic neutropenia and cured by splenectomy. The characteristic features were splenomegaly, granulocytopenia of the peripheral blood and myeloid hyperplasia of the bone marrow. In a subsequent report in 1942¹⁰ they describe acute, sub-acute and chronic forms, and pointed out that the syndrome was closely related to congenital hæmolytic jaundice and essential thrombocytopenic purpura, as in some cases the neutropenia was accompanied by hæmolytic anæmia or thrombocytopenia or both. Simultaneous reduction of all cellular elements is called splenic pancytopenia. Excessive splenic phagocytosis was regarded as the responsible mechanism. Dameshek, as had Reissmann, suggested that the neutropenia was due to a hormonal splenic influence on the bone marrow, that is, a form of hypersplenism.

Whether the condition is due to splenic phagocytosis or to hormonal splenic influence on the marrow, has not been decided. In all cases reported to date splenomegaly was present and splenectomy resulted in a prompt and sustained remission of the neutropenia. Hattersley¹¹ recently reported a case of chronic neutropenia without splenomegaly which failed to respond to the operation, and suggested that lack of splenomegaly should be regarded as a contraindication. According to Dameshek¹ splenic neutropenia may be primary, or it may be associated with the splenomegaly of Felty's

syndrome, Boeck's sarcoid, Gaucher's disease, tuberculosis of the spleen, malaria or kala-azar.

CASE 3

J.B., male aged 12 years, an only child of a neurotic and rather anæmic mother, had the ordinary diseases of childhood and diphtheria. He was subject to epistaxis. In December, 1945, he had influenza and in February, 1946, a severe attack of varicella. Convalescence was slow and during the next few months the patient suffered from weakness, anorexia and a tendency to perspire easily. On August 6, 1946, he was found by his family physician to have a temperature of 101° and he was pale and tired looking. Blood count revealed a marked anæmia, and a leucocyte count of 1,200. (Details of count not available, but granulocytes were very low.) Agranulocytosis was diagnosed. Penicillin and vitamin therapy were started. Fever persisted for several days, and, for a few weeks vomiting and diarrhoea were troublesome. The spleen and liver were not palpable and there were no enlarged glands. At this time aleukæmic leukaemia was suspected. A blood transfusion was given on August 24, and liver, iron and vitamins daily. Considerable improvement followed. In September the patient was brought to Halifax for a sternal marrow examination and hæmogram. The findings were characteristic of splenic neutropenia and splenectomy was advised.

The patient was admitted to hospital on November 15, 1946. He had no complaints other than some weakness. The temperature and pulse rate were very slightly elevated. Physical examination revealed a moderate obesity, pallor and some enlargement of the spleen to percussion. A few enlarged glands were present in the submaxillary regions. Examination was otherwise negative.

Laboratory findings.—Urine, normal; Kahn, negative; bleeding and coagulation times, normal; Widal and skin test for undulant fever, negative; Hgb. 72%; red blood cells 3,340,000; colour index 1.09; white blood cells 2,200; platelets 260,000. Mild anisocytosis, no polychromasia or nucleated red cells; no immature white cells. Differential: juvenile 0; band 0; seg. polymorphonuclears 13; lymphocytes 54; large mononuclears 28; eosinophiles 2; basophiles 2; plasma cell 1. Comment: neutropenia with relative lymphocytosis and monocytosis and a moderate normocytic anæmia.

The marrow from a sternal puncture showed a moderate myeloid hyperplasia with maturation arrest at the band form stage. The polymorphonuclears were 2.0% and eosinophiles 1.5%. The appearances did not suggest leukaemia but in conjunction with the marked peripheral neutropenia were in keeping with the diagnosis of primary splenic neutropenia.

On November 28, splenectomy was performed by Dr. C. E. Kinley. The organ was moderately enlarged and a few adhesions were present. A small accessory spleen was seen near the hilum and this was also removed. During the operation the patient received 500 c.c. of saline and 500 c.c. of blood. Leucocyte counts were performed before, during and after the operation with the following results.

TABLE I.

Time	Leucocytes
Preoperative	2,800
After handling spleen	5,650
25 minutes after clamping pedicle	6,150
45 minutes after clamping pedicle	8,300
4 hours after clamping pedicle	10,100
7 hours postoperative	14,450
13 hours postoperative	9,500
24 hours postoperative	9,300
December 3, 1946	6,600
December 13, 1946	5,800

DIFFERENTIAL SCHILLING COUNTS

Cells	Pre-operative	4 hours post-operative	7 hours	13 hours	24 hours	Dec. 3	Dec. 13
	%	%	%	%	%	%	%
Myelocytes	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Juveniles	0.0	1.0	1.0	2.0	0.0	0.0	2.0
Band forms	1.0	45.0	35.0	22.0	15.0	0.0	1.0
Seg. polymorpho-nuclears	2.0	20.0	48.0	48.0	53.0	20.0	23.0
Lymphocytes	79.0	14.0	5.0	9.0	13.0	57.0	62.0
Large monocytes	16.0	21.0	10.0	19.0	18.0	18.5	9.0
Eosinophiles	1.0	0.0	0.0	0.0	0.0	3.0	1.0
Basophiles	1.0	0.0	0.0	0.0	1.0	1.0	2.0

Pathologist's report.—The spleen is enlarged, weighing 575 gm. Its surface is smooth and a deep purple colour. On section the cut surface is very congested, free blood pouring from it. The Malpighian bodies are very prominent, standing out as whitish nodules varying from 1 to 2 mm. in diameter. Histology reveals marked congestion of the sinusoids of the pulp with very marked hyperplasia of the lymph follicles. There is some endothelial cell hyperplasia but no active phagocytosis of blood cells. I can detect no evidence of malignancy, tuberculosis or sarcoidosis. Diagnosis, non-specific lymphoid hyperplasia (Dr. R. P. Smith).

The postoperative course was uneventful and the patient was discharged on December 14, 1946. Since that time he has been receiving iron and vitamin therapy. He has been in good health, carrying on normal activities. Blood pictures have been done at three month intervals and both are within normal limits, except that the total white cell count remains elevated at 10,700 and 13,400, but the polymorphonuclear count is somewhat low at 36 and 34%. This may be due to an accessory spleen which is still exerting a mild hypersplenic influence.

FELTY'S SYNDROME

Felty¹² in 1924 reported 5 cases of adults with polyarthritis of the atrophic variety, fever, secondary anæmia, leukopenia, splenomegaly and tachycardia. Hanrahan and Miller¹³ were the first to report the beneficial effects of splenectomy in the condition. Steinberg¹⁴ studied the bone marrow in Felty's syndrome and in other forms of atrophic arthritis and found that all showed hyperplasia. In his opinion the neutropenia was due to a splenic influence acting as a barrier to the releasing of the granulocytes from the marrow into the blood as demonstrated by the improvement following splenectomy. Felty's syndrome may be regarded as an example of splenic neutropenia due to hypersplenism but differing from the primary form. It is generally agreed that splenectomy will not likely influence the arthritis, but in patients with a steadily enlarging spleen or in those subject to intercurrent infections the operation seems justified.

CASE 4

Mrs. M.N., aged 71 years. Admitted to hospital August 23, 1946, complaining of (1) a mass in the left

side of the abdomen; (2) arthritis. Family history, not contributory. Personal history, O.D.C. Scarlet fever. Pneumonia 1945. Ten children; one miscarriage. Polyarthritis had been present for 5 years. About March, 1946 the patient discovered a mass in the upper part of the abdomen in the left side, which had gradually increased in size, causing discomfort but no other symptoms. She was a thin elderly woman with rheumatoid arthritis, marked splenomegaly and slight hepatomegaly. The examination was otherwise essentially negative.

Laboratory examination.—Urine and blood-chemistry, normal; Kahn, negative; bleeding time, 20 minutes; coagulation time, 2¾ minutes; Hgb. 72%; red blood cells 4,490,000; colour index 0.8; white blood cells 2,400; platelets 179,000. Differential: juvenile 0; band 2.0; seg. polymorphonuclears 0.0; lymphocytes 81.0; large monocytes 12.0; eosinophiles 5; basophiles 0. Normocytic anæmia with slight polychromasia; no immature white cells. Profound neutropenia present with only 48 granulocytes per c.mm. of blood.

TABLE II.
STERNAL PUNCTURE MYELOGRAM

	Percentage
Myeloblasts	3.0
Promyelocytes	8.0
Myelocytes	16.5
Juveniles	16.5
Band forms	13.5
Polymorphonuclears	1.5
Eosinophiles	1.5
Basophiles	0.0
Lymphocytes	14.0
Monocytes	0.0
Erythroblasts	8.0
Early normoblasts	7.0
Late normoblasts	10.5

The myelogram shows a moderate myeloid hyperplasia with maturation arrest at the band form stage. There is evidence of active erythropoiesis. The appearances do not suggest a myelogenous leukaemia.

The association of rheumatoid arthritis, splenomegaly, granulocytopenia with myeloid hyperplasia of the marrow justified a diagnosis of Felty's syndrome. In view of the discomfort occasioned by the spleen which had been gradually increasing in size, and with the granulocytopenia rendering the patient liable to infections, splenectomy was advised with the realization that the arthritis would not likely be benefited. On September 20, 1946, splenectomy was performed by Dr. Kinley. The massive spleen presented numerous adhesions and old infarcts. The splenic artery was markedly dilated, and there was a large vein in the gastro-splenic ligament. Pathologist's report: Spleen is much enlarged weighing 750 gm. The surface is smooth and of a grayish purple colour. At the upper pole there is an irregular area of chronic perisplenitis with two depressed stellate scars. Lying in the hilum are three accessory spleens, the size of marbles. Cut

surface is firm, glistening and deep red in colour. The Malpighian bodies stand out clearly but are not unduly hyperplastic in the gross. Histological examination, shows some chronic perisplenitis with a marked diffuse endothelial hyperplasia, the endothelial cells showing definite phagocytosis of polymorphonuclears and a few red cells. Such an appearance is characteristic of a chronic neutropenic splenomegaly. The biopsy of the liver only shows some fatty degeneration and a little lymphocytic infiltration of the portal tract areas. There is no special proliferation of the Kupffer cells (Dr. R. P. Smith).

Following the operation the patient was given penicillin and a blood transfusion. The postoperative course was normal.

TABLE III.
EFFECT OF SPLENECTOMY ON THE LEUCOCYTE COUNT

	White blood count
September 20—Immediately before splenectomy	1,500
15 minutes after pedicle clamped	7,850
30 “ “ “ “	4,300
6 hours “ “ “ “	16,650
11 “ “ “ “	18,500
September 21—24 “ “ “ “	22,350
September 23	17,700
September 25	12,750
October 7	5,900

TABLE IV.
DIFFERENTIAL SCHILLING COUNTS

Cells	September 4, 1946	September 20 30 minutes after pedicle clamped	September 21	September 25	October 7
Myelocytes	0	0	1	0	0
Juveniles	0	0	2	3	0
Band forms	2	10	63	12	0
Seg. polymorphonuclears ..	0	4	19	62	48
Lymphocytes	81	71	8	15	31
Large monocytes	12	9	7	4	17
Eosinophiles	5	3	0	3	3
Basophiles	0	3	0	1	1

The patient was discharged from hospital October 8, 1946. Her general health has been much better since the operation, even the arthritis being less troublesome. She is able to do some housework whereas previously she was almost a complete invalid. The blood picture on September 22, 1947, was as follows: Hb. 73%; red blood cells 4,330,000; white blood cells 10,200; juvenile 0; bands 1; seg. polymorphonuclears 46; lymphocytes 52; large monocytes 0; eosinophiles 1; basophiles 0.

The marked improvement in this case of Felty's syndrome demonstrates the possibilities of splenectomy for the condition.

BANTI'S SYNDROME

In 1883 Banti first called attention to this condition and subsequently described its three stages, the anæmic, the transitional and the ascitic. Until recently the results of splenectomy have been disappointing. Whipple¹⁵ has reported a most interesting investigation of portal hypertension. This may be due to intrahepatic block, that is cirrhosis, or to extrahepatic block in the portal bed. Whether

the block is intra- or extra-hepatic can usually be determined by liver function tests. If the extrahepatic block is distal to the junction of the coronary vein with the portal system, splenectomy will give satisfactory results. In other cases of extrahepatic or in intrahepatic block it should provide some relief until portal hypertension builds up again, but it will not effect a cure. Blakemore and Lord¹⁶ have had encouraging results in the treatment of portal hypertension by establishing porto-caval shunts, but the operation is experimental and difficult. No doubt these new concepts of Banti's syndrome will mean a more careful selection of cases for operation.

CASE 4

Mrs. Z., aged 25. Admitted to hospital April 2, 1945, complaining of anæmia and enlarged spleen. Family history non-contributory. Personal history: jaundice at 7 and again at 17. She had always been pale; no history of hæmorrhages. Splenomegaly was discovered 5 years previously. Obstetrical history—two children, both normal deliveries. Physical examination, moderately pale, well nourished; slight cardiac enlargement with

systolic murmurs in the mitral and aortic areas; marked splenomegaly; no enlarged lymph nodes, blood pressure 120/80. Early pregnancy was suspected.

Laboratory findings: Kahn, negative; blood chemistry, normal. Urinalysis, albumin one plus; sugar negative. Microscopically, a few red cells and a few white blood cells; Hb. 53%; red blood cells 2,500,000; white blood cells 5,900; differential count, juvenile 0; band 4; seg. polymorphonuclears 46; lymphocytes 48; large monocytes 1; eosinophiles 1; basophiles 0; microcytes with a few macrocytes; no nucleated reds, but a few show polychromatophilia; platelets 114,000; icterus index 10; Fouchet test, positive; van den Bergh, direct immediate, negative; direct biphasic, negative; direct delayed, positive; indirect, slightly positive. Hæmatocrit, 24 mm. (56% of normal). Volume index 1.1. X-ray examination of œsophagus, negative for varicosities.

Following a transfusion, patient was discharged April 18, 1945. Banti's syndrome was regarded as the most likely diagnosis.

Readmitted June 1, 1945. Examination revealed a three months' pregnancy. Otherwise her condition was unchanged; Hgb. 45%; red blood cells 2,210,000; white blood cells 5,700. Differential count, juvenile 2; band 4; seg. polymorphonuclears 65; lymphocytes 26; large monocytes 1; eosinophiles 2; basophiles 0. Platelets 265,000. Bleeding time 2.2 minutes. Owing to the large size of the spleen and the likelihood of this complicating

pregnancy, it was felt that splenectomy was indicated. The patient received 5 blood transfusions and on June 29, splenectomy was performed by Dr. Curry. The spleen weighed 890 gm. and the pathologist, Dr. Smith, reported that it showed the characteristics of Banti's syndrome.

Postoperative course was uneventful. The patient was given iron, liver and vitamins. On July 11, Hgb. 65%; red blood cells 3,680,000. July 17, blood platelets 220,800. She was discharged in excellent condition. The remainder of her pregnancy was normal and delivery uncomplicated. She has since had another healthy child and her general condition is very good. November 11, 1947, blood picture Hgb. 80%; red blood cells 4,000,000; white blood cells 12,100; platelets 200,000; bleeding time, normal; reticulocytes, less than 2%.

SUMMARY

The hæmatological disorders in which splenectomy is commonly employed have been mentioned briefly and five cases illustrating its value have been presented.

In considering splenectomy, its indications, limitations and dangers must be fully recognized. The co-operation of the internist, hæmatologist and surgeon is essential. Authorities on the subject appear to be generally agreed that the hæmatological conditions for which the operation may be considered most valuable are as follows: (1) Congenital hæmolytic jaundice. (2) Selected cases of acquired hæmolytic anæmia, acute and chronic forms. (3) Thrombocytopenic purpura, idiopathic or associated with a disease causing hypersplenism. (4) Splenic neutropenia, either primary or symptomatic. (5) Certain cases of Banti's syndrome.

In other disorders of this category splenectomy is either contraindicated or it plays a minor rôle.

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THE ESTIMATION OF HEARING LOSSES FOR PURPOSES OF THE ADJUDICATION OF DISABILITY CLAIMS

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THERE is overwhelming evidence to indicate that the estimation of hearing losses for speech by the use of the conversational voice test, as carried out in any ordinary clinic or office building, is dependent upon so many variable factors as to render it an extremely unreliable test. Among the variables may be mentioned particularly the following:

(a) Although examiners endeavour to use residual air only and modulate their voices so as to introduce some degree of accuracy and standardization, it has been shown conclusively that the reflex of raising the voice as distance from the patient increases, is so strong that, experimentally, using a sound level meter and a group of qualified experienced examiners, no change of loudness for the spoken voice at distances of 15 and 5 feet was recorded with the exception of the voices of 3 otologists of the group of examiners used in the experiments (Fowler¹).

(b) Ambient noises are an important factor. The noise level of an ordinary clinic or office building is reliably estimated at from 40 to 65 decibels and for a "sound damped" room from 25 to 35 decibels. Therefore the noise in such environments is sufficient to change the threshold of hearing these amounts without examiners being aware of it.

(c) The pitch and clearness of enunciation of the examiner's voice and the acoustics of rooms used are important variables to be considered. A highly pitched voice will show less loss of hearing within the speech range than will a voice of lower pitch. Words used during the test, unless carefully chosen, will give misleading results as there are groups of words heard best within the lower (speech) frequencies and other groups of words containing sounds heard best within frequencies higher than the speech range (for practical purposes the speech range to be regarded as up to 2,500 double vibrations per second). For examples see list of words outlined in publication by Ersner and Sallyman.² The conduction and reflection of sound by the interior of rooms have been shown to

be important factors. This is supported by physical laws governing acoustics.

(d) E. P. Fowler, Jr.¹ an outstanding otologist who has done a vast amount of original work in otology states that "the distance that voice and whisper can be heard has been shown repeatedly to vary up to 200%". In this connection Fowler quotes Bunch,³ and Fowler.⁴ Fowler further states, and produces the results of experiments in proof, that "Often the loudness of the spoken voice reaching the decibel meter and the patient was greater at 15 feet than at 5 feet. Add to this the known fact that voices are different and that ambient noise and wall conduction are ever present artefacts in all hearing tests, and it becomes apparent why in an ordinary room (voice level 40 to 60 decibels) the loudness of spoken voice is completely unpredictable".

(e) An extensive study in correlating the results of the whispered voice tests, tuning fork tests and audiometric tests has been carried out by Trowbridge.⁵ In commenting upon the noise level of clinics and office buildings he states that "a speech test made in such an environment would not differentiate between ears that are normal and those having a 30 decibel loss in hearing" and further states ". . . the low conversational voice tests were discarded since the basic conditions involved in these tests present too many variable features not susceptible to reasonable standardization". The analysis contained in this article is based on the examination of 24,740 patients. Although whispered voice was found to be much more reliable than conversational voice, such variations were noted for whispered voice which lead to the following statement "Results of this nature certainly preclude any justifiable conclusions being made from the whispered voice test alone".

(f) The most successful large scale effort yet made towards the rehabilitation of the hard of hearing has been carried out under the direction of Lederer⁶ in connection with the development of the U.S. Naval Hospital, Philadelphia, as a national naval centre for aural rehabilitation where the patient load in mid-summer 1945 averaged between 600 and 700. Lederer states in outlining the development of this centre:

"We have learned that the classic military hearing tests which made use of the watch-tick, the coin click

and conversational voice are thoroughly unscientific as measurements of hearing acuity. The whispered voice test has been found somewhat more informative but it is primarily a measurement of a high-frequency hearing loss and requires careful interpretations when it is used institutionally. Aside from the functional tests with tuning forks, still considered clinically useful for diagnostic purposes, we place our reliance in the quantification of hearing loss by means of audiometry and the measurement of speech reception with an electronic evaluator whose sound pressure output is adequately monitored."

He notes in passing that "almost 40% of our patients had defective hearing or aural pathosis before their entrance into the service" and of this group of 40% it is noted that on a "benefit of doubt" basis attributability of the hearing losses to service causes was conceded in 93%.

The latter statement is of particular interest in confirming the impression of the majority of otologists who have been concerned with the examination of veteran personnel that the medical screening at service induction or reception centres of the future must include, as a routine, an appraisal of hearing losses at the time of enlistment which can only be carried out through audiometry.

(g) In an extensive review by Lederer and Hardy⁷ further condemnation of the conversational voice test is found in the following statement:

"There is little question that the conversational voice test is so variable as to be essentially meaningless, it produces only the roughest kind of estimate, which is serviceable only for the early stages of screening. It is retained in the process at Philadelphia only because it remains a traditional requirement in the eyes of various boards of review. . . ."

The most reliable present day method known for measuring loss of hearing for speech is by audiometry. Imperfections are admitted in estimating loss of hearing for speech by pure tones only, but for all purposes pure tone audiometry is the best known standard to date for both diagnostic methods and hearing loss estimation and certainly far more reliable than a conversational voice test carried out in a Vancouver clinic by Dr. Y and in a Montreal clinic by Dr. X. However, for purposes of estimating more accurately hearing loss for speech the pure tones may be supplemented by the use of the monitored human voice (live voice). This method requires, however, the use of a sound-proof room in which speech is presented by means of a loud speaker and is controlled in intensity to an accuracy of one

decibel through a range of from eighty to one hundred decibels above normal threshold. The intensity of the speaker's voice is regulated as desired and the sentences used are those devised by the Bell Telephone laboratories comprising selected sentences having key words which are essential in the correct repetition of sentences. Accuracy is determined by correct verbatim repetition.

On audiograms prepared at the Queen Mary Veterans' Hospital, Montreal, the results of the tests made by controlled speech appear as "speech effective thresholds" from which the loss of hearing for speech is measured in decibels from a known intensity and is independent of the calculated percentage loss for speech based on the patient's ability to hear sounds of 500, 1,000 and 2,000 frequencies. No difficulty should be experienced, if desired, in translating losses as shown by such speech thresholds, or by the percentage loss of hearing for speech as shown by the use of pure tone audiometry, into terms of conversational voice to conform with existing tables of disabilities. Audiogram and hearing loss charts, as prepared by E. P. Fowler and P. E. Sabine, which provide for the computation of the binaural percentage loss of capacity to hear speech, are available through the American Medical Association.

At the present time facilities for the estimation of hearing losses by the use of sound-proof rooms and the monitored human voice exist only in very few centres. Two such equipments are available in the Montreal area (the Montreal General Hospital and the Queen Mary Veterans' Hospital) both of which operate under the extremely capable supervision of Dr. Hector Mortimer who, in collaboration with E. G. Burr, Associate Professor of Electrical Engineering, McGill University and Dr. Geo. Hodge, Chief Otologist of the Montreal General Hospital, is largely responsible for this equipment being made available in both these centres. It is understood that similar equipment is at present being provided in the Toronto area and while it is to be expected that other centres will in time be also similarly equipped, the general adoption of audiometric tests for the use in the adjudication of disability claims, must depend also upon the estimation of hearing losses by pure tone audiometry

in centres where the more elaborate equipment is not available.

In this connection the comments of Lederer and Hardy⁷ are of special interest:

"The suggestion has already been made in this discussion that audiometry as carried out in the naval program includes determining the hearing threshold for discrete frequencies and also that for speech reception in a free field and that, although the one is quite as useful as the other, if the examiner were faced with a choice between the two, he might be closer to knowledge of a patient's practical hearing if he knew the level of speech reception. The precise correlation between these two measurements has not yet been worked out. In our procedures it is typically fairly close but not infrequently exhibits variations. . . ."

To this end it is believed that arrangements should therefore be made, for the disposal of personnel in whose cases accurate hearing loss estimates are desired, by (a) calling in such cases to the centres where complete equipment is available; or (b) disposing of such cases through pure tone audiometry supplied through the use of technicians and standard audiometers, properly calibrated at regular intervals and available at both permanent and temporary centres.

Recently Dr. Hector Mortimer and I had discussed effecting arrangements which would place before us in a large number of cases the results of clinical tests for hearing losses compared with audiometric estimates. This project was discussed with an American confrère who has done a great deal of work in the past along these lines and who remarked "you would only be wasting your time—this work has been thoroughly covered".

No originality is claimed for this communication. It has been prepared more in the nature of a memorandum which might assist in stimulating the interest of those concerned in the estimation of hearing losses for industrial or other purposes by the only methods known at present which approach accuracy.

SUMMARY

1. The estimation of hearing losses by the use of the orthodox conversational voice test has been shown to be too susceptible of individual error and extraneous influences, to be of any real value.
2. Audiometry, particularly that which is provided by the use of sound-proof rooms and the monitored human voice (live voice), is the most accurate method yet known for the

estimation of hearing losses for all practical purposes.

3. Information is accumulating which indicates that, as an essential phase of routine medical screening, the identification of hearing defects by audiometry would be a sound economic step in connection with the mobilization of man power for industry or in a national emergency.

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RUTIN IN HÆMATURIA OF CONGENITAL POLYCYSTIC DISEASE OF THE KIDNEYS

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A WOMAN, aged 44 years, presented herself in October, 1947, for examination because of attacks of gross hæmaturia since June, 1945. These attacks lasted three months at a time and necessitated bed-rest. She had been examined elsewhere in 1945 and the diagnosis of bilateral congenital polycystic disease of the kidneys had been made, but no laboratory reports were obtainable for comparison.

On examination in St. Joseph's Hospital it was found that both kidneys were palpable and uneven. Her blood pressure was 210/150. The urinalysis was as follows: colour, red straw; specific gravity 1.005; albumin plus 1; sugar, negative; red blood cells 2 plus. The phenol-sulphonphthalein test showed poor excretion, 7% in the 1st hour and 10% in the 2nd hour, a total of 17% in 2 hours. The blood chemistry was as follows: non-protein nitrogen 48 mgm. %; creatinin 2.1 mgm. %; sugar 104 mgm. %. Her blood count showed 3,400,000 red cells, 9,500 white cells and 73% hæmoglobin. No test for capillary fragility was performed. The intravenous pyelogram revealed inadequate visualization of the urinary tract due to diminished excretory function. Both kidneys, however, were grossly enlarged. A retrograde pyelogram

was made on the left side only. This kidney was shown to be enlarged in a uniform manner with crescentic distortion of the minor calyces of the type seen in congenital polycystic disease.

This patient, then, had bilateral congenital polycystic kidneys, with gross hæmaturia, marked impairment of kidney function, hypertension and mild secondary anæmia.

In this case hæmaturia was the outstanding symptom. As nothing could be done to improve the underlying lesion, an attempt was made to relieve the patient symptomatically. Rutin, a glucoside of green buckwheat, has been used to control cerebral and retinal hæmorrhage in hypertension by reason of its effect on capillary resistance. I had seen no reference to its use in hæmaturia, but felt that there was no danger in trying it, as it is non-toxic. Cerutin (Frosst), 20 mgm. rutin to which 50 mgm. of ascorbic acid had been added, was given three times a day with gratifying results. The bleeding stopped promptly. There has been no gross hæmaturia in six months. The patient feels better than at any time since 1945 and is working steadily. She is also relieved emotionally because of the suppression of the visible sign of her disability.

Rutin was described in 1842, but no practical value seems to have been attached to it until recently. In 1936 Szent-Gyorgyi *et al.*¹ isolated a substance from paprika and citrus fruits, differing from vitamin C, which they called citrin. Because of its effect on capillary fragility it was called the permeability factor or vitamin P. It was thought that hesperidin, eriodictin and quercitrin were the active principles. Later it was believed that vitamin C was necessary to activate vitamin P. The active principle apparently had a flavonol structure. Lavollay,² Neumann,³ Parrott⁴ and Sévin⁵ found that the property of increasing capillary resistance and of prolonging the action of adrenalin by preventing its oxidation belonged to flavones as a class. Couch *et al.*,⁶ noting the similarity in structure, thought that rutin might have a beneficial effect on abnormally fragile capillaries. Clinical tests over three years confirmed its value in certain cases. The usual dose was 20 mgm. t.i.d. and sometimes 40 mgm. Their original source was tobacco and the product was expensive. Couch¹² later isolated it from green buckwheat. The yield then was greater and the cost much reduced. It is present in many plants.

Griffith and Lindauer⁷ showed that there was an increase in capillary fragility in 18% of 265 cases of hypertension and that these are more exposed to apoplexy, retinal hæmorrhage and death. Thiocyanate increases this fragility and therefore increases the risk of vascular accidents. In 84% of the cases with increased capillary fragility, hesperidin and hesperidin methyl chalone restored it to normal. Griffith, Couch and Lindauer⁸ found that, in certain cases, rutin appeared to have the property of decreasing capillary fragility where this fragility was increased initially. They used it for 16 months in man with no toxic effects.

Shanno¹³ used it in 13 cases of hypertension with increased fragility as shown by the Gothlin test. This index was improved in all. In two cases of pulmonary hæmorrhage of undetermined origin with increased capillary fragility, the bleeding stopped with rutin therapy and the index returned to normal. He concluded that rutin had an action on capillaries, equal or possibly superior to that shown by members of the hesperidin group. Johnson¹⁴ mentioned that rutin is less effective if there exists a simultaneous vitamin C deficiency. He also stated that it had been used up to 30 months and that the material cost had dropped from \$150 down to \$1.10 per lb. The report of the Council on Pharmacy of the American Medical Association¹⁵ in 1946 advocated caution due to newspaper publicity on rutin as a cure for high blood pressure. In the medical literature there is no claim that it cures hypertension, although sometimes this is lowered. Its action is primarily on capillary fragility.

Kushlan¹⁶ used rutin in a patient suffering for 15 years from chronic melæna due to hereditary hæmorrhagic telangiectasia, proved by gastroscopic examination. The patient also exhibited daily moderate epistaxis and slight daily bleeding from the gums for 40 years. Within 24 hours the bleeding from the nose and gums stopped for the first time in 40 years and in two weeks the guaiac test on the stool was negative. He suggested that rutin therapy may represent the long-sought-for specific remedy for hereditary hæmorrhagic telangiectasia.

MacLean and Brambel⁷ discussed the use of rutin in retinal vascular disorders. Stocker¹⁸ reported experiments on the possible influence on the permeability of the blood-aqueous barrier. These were inconclusive. In view of the far-

reaching possibilities for the medical treatment of glaucoma, he felt that further study is justified. Wilson, Mortarolli and Duxtader,¹⁹ after animal experimentation, concluded that rutin does not show acute or chronic toxicity. Griffith, Anthony, Pendergrass and Perryman²⁰ produced increased capillary fragility in rats by irradiation and showed that rutin appeared to hasten the recovery time after irradiation. McManus and Landrigan²¹ in a small test series found that rutin was ineffective in decreasing capillary fragility. Madison and Pohle,²² however, stated that the results suggested that it did exert a favourable influence on vascular fragility in some types of purpura.

Wolffe and Danish²⁴ used up to 300 mgm. daily. They suggested that early in the administration of rutin there is a period of increased tendency to hæmorrhage, a so-called vulnerable period. They have some work on animals which also suggested this. Naghski, Copley and Couch²⁷ stated that the three flavonols, rutin, quercitrin and quercetin, were capable of neutralizing the bacteriostatic action of dicoumarol. The results also suggested the possibility of using rutin or the other flavonols to antagonize the hæmorrhagic action of dicoumarol.

Czimmer (quoted by Couch¹¹) studied the effect of rutin on the isolated frog's heart. The action of the normal heart was increased. The force of the depressed heart was restored, the pulse was slowed and the minute volume increased. Diuresis following the administration of flavonols was reported by Akamatsu and Fukuda and Kono. Rutin combined with caffeine or theophylline increased the diuretic action in intensity and duration (Couch¹¹). Lavollay and Neumann reported that preliminary injection of quercitrin prevented peptone shock (Couch¹¹).

Zfass²⁶ preferred rutin to crude hesperidin because it was a pure substance, amenable to accurate dosage and because it could be given in smaller doses, 20 mgm. instead of 500 mgm. He used it in 13 patients, mostly hypertensives. One girl had been "vomiting" small amounts of bright blood especially at her periods (but not consistently) for two years. Laryngoscopic examination was negative and x-ray study of her œsophagus, stomach and duodenum revealed no abnormality. Her petechial index was 17. This returned to normal after four weeks' treatment and there was no further bleeding. He con-

cluded that rutin may prove to be a valuable drug in preventing cerebral vascular accidents and retinal hæmorrhages and insidious bleeding of unknown origin in those patients showing increased capillary fragility.

SUMMARY

A case of gross hæmaturia in congenital polycystic disease of the kidneys treated by rutin has been presented. It is suggested that rutin may also prove of value in essential hæmaturia. The literature on rutin has been reviewed. Rutin is a flavone which apparently has an effect on capillary resistance. It has been used in vascular disturbances particularly of the eyes and may lessen the danger of vascular accidents in hypertension. It has been used in purpura and in bleeding from the lungs, gums and gastrointestinal tract. Because of its effect on capillary resistance the author suggests that rutin may find a place in the treatment of shock, ascites, œdema and even some of the eczemas. Investigation is being carried on along these lines.

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THE DIFFERENTIAL DIAGNOSIS OF CHRONIC LOWER EXTREMITY SYMPTOMS*

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THE great majority of patients attending a peripheral vascular clinic have complaints involving the lower extremities. Such a clinic, therefore, becomes known as a "leg" clinic and patients with troubles involving the leg from any cause are consequently referred for diagnosis and treatment. Not infrequently, the symptoms presented do not occur primarily from a peripheral vascular lesion, but result from other conditions which directly or indirectly involve the leg. As the result of such experiences in the Peripheral Vascular Clinic of the Royal Victoria Hospital, I thought it might be of interest to give a brief description of the investigative methods used, and a differential account of the conditions most frequently encountered.

INVESTIGATION

On the first attendance, a careful history is obtained, blood is sent for a Wassermann test, and the urine is examined. Both lower extremities are exposed to the groin and the appearance of the foot and leg are noted. The state of nutrition of the soft tissues of the foot is ascertained and the pedal and leg pulses carefully palpated. In the presence of varicose veins, the location and degree of the varices is noted. The Trendelenburg test is used to determine the presence or absence of reverse flow in the superficial veins on standing. If the Trendelenburg test shows reverse flow other than from the upper end of the great saphenous vein, the modified version known as the "comparative tourniquet test" is employed to find the location of the incompetent communicating vein or veins. This test consists of a progressively distal placement of the superficial tourniquet until the level is found where immediate filling of the varices ceases on changing from the horizontal to the vertical position. The small saphenous vein is routinely palpated just below the popliteal fossa and is especially suspected when varices in the calf are found.

When arterial deficiency is probable, the degree of ischæmia of the foot on elevation and rubor on dependency is noted. When present, the degree of colour change is a good index to the extent of arterial involvement. The temperature of the two feet is compared and evidence of ischæmic trophic changes in the foot is sought. The femoral arteries are auscultated for bruits which indicate, in such cases, a partial obstruction to the proximal vessel caused most commonly by an arteriosclerotic plaque. Oscillometric readings are done to give a graphic record of the degree of pulsations of the main leg arteries. A lateral view of the aorta and an antero-posterior of the pelvis is taken for evidence of arteriosclerotic calcification. Skin temperature readings are done before and after blockage of the lumbar sympathetic chain to the more affected leg in all cases of obliterative and spastic arterial disease to determine the degree of remaining potential vasodilatation. Cardio-logical and hæmatological examinations, including blood sugar determinations, are done where indicated.

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Where any uncertainty in diagnosis exists, the feet are carefully assessed for structural defects, the leg lengths are measured, the joints examined and a careful neurological examination is carried out. With the above information, the diagnosis can usually be made when organic disease is present. Cases with lesions other than peripheral vascular are sent to the appropriate department for further study and treatment.

VENOUS LESIONS

Varicose veins.—This is the commonest type of condition seen in a peripheral vascular clinic. The diagnosis is simple in the majority, but may be missed in the very fat leg unless inspection is combined with palpation. Uncomplicated varicose veins may produce no symptoms, even when moderately severe, and in such instances the patient reports for cosmetic reasons. However when symptoms are present, the pattern is very consistent. The patient complains of a fullness and heaviness usually in the lower leg more marked in the area of the enlarged veins, which may be severe enough to be described as a dragging pain or ache. This occurs only when in the upright position and is relieved when lying down. The discomfort is less on walking than when standing and increases as the day progresses. In a small proportion of cases nocturnal muscle cramps occur. In women, symptoms are usually aggravated by the menses and, in some, only occur at that time.

The above pattern of symptoms should only be present in the moderately advanced or severe case of varicose veins where reversal of flow in the affected veins occurs when upright, and any variant should put the examiner on guard for some lesion other than varicose veins. In the case of enlarged veins where no reverse flow on standing is present and careful examination reveals no other cause for the symptoms, local injection of the veins is justified as a diagnostic test.

Superficial phlebitis and periphlebitis.—These patients commonly have had varicose veins for years but with little bother, and have only presented themselves because of a new and recent episode of discomfort. They complain of pain and soreness in a localized area, usually along some segment of the great saphenous vein where varicosities were previously present. The symptoms are worse when ambulatory and aided by rest, local heat and support. Fever, general malaise and mild œdema of the lower leg are present in the more extensive degrees of involvement.

Examination reveals firm tender lumps in the formerly soft varices with increased warmth, surrounding redness and induration. Slight pitting œdema may be present in the foot and ankle region but is more marked in the area of the thrombosed varices. A diagnosis of superficial phlebitis should not be made unless the phlebitic process can be seen and felt.

Deep phlebitis.—Varying degrees of thrombophlebitis occur, from a relatively symptomless bland thrombosis to that of a severe suppurative thrombophlebitis. Deep phlebitis is most often an accompaniment of some other disease or surgical procedure, but may occur for no known cause in a person previously well. In common with other thrombotic conditions, it is more frequent in the autumn and winter months. Those patients seen in an outpatient clinic are therefore of spontaneous origin or, more rarely, those who have developed a delayed subacute variety after discharge from hospital for some illness or operation. The late cases seek treatment because of the sequelæ of a deep phlebitis such as ulceration and eczema.

In acute or subacute deep phlebitis the complaint is of deep boring aching pain variously situated in the sole of the foot, the calf, the popliteal area or medial side of the thigh. Most characteristic of this pain is the fact that it is increased on standing but decreased by walking or lying down. Examination will show a combination of the following findings in greater or lesser degree: fever, increased pulse rate, slight to severe œdema of the foot and lower leg, a palpable sensation of fullness in the muscles of the calf region, deep tenderness to pressure most commonly in the calf but found also in the lateral side of the sole of the foot, the popliteal region and along the femoral vessels in the thigh. Pain in the calf area on dorsiflexion of the foot is common (Homan's sign) and slight to severe cyanosis of the foot and abnormal dilatation of the veins on the dorsum can be seen after dependency of the leg.

ARTERIAL DISTURBANCES

Conditions resulting from chronic arterial spasm.—Acute arterial spasm such as that following arterial injuries, lodgment of an embolus or in acute arterial thrombosis is not seen in out patients, but there is a group that is occasionally encountered of poorly defined conditions who have chronic arterial spasm as

a primary causative factor. This group differs from true Raynaud's disease inasmuch as it does not come in attacks with the typical three-colour phase of Raynaud's and does not have cold as an initiating factor. The most frequent type in this group is seen following acute trauma of any degree to the leg and occasionally following infections such as deep phlebitis. It may be of varying degree, from that of the case of excessive pain and oedema following acute trauma to that of the chronic crippling type known variously as Sudeck's atrophy, post-traumatic painful osteoporosis and chronic traumatic oedema. However other varieties are not so well marked and have an origin which is less definite. In all these conditions, however, emotional instability is often found suggesting a psychogenic factor. Women are more often involved than men.

Except in post-traumatic cases, the symptoms usually involve both extremities and have many variations including chronic coldness of the feet, pain of a burning character in the foot and leg, increased sweating of the foot and areas of numbness or hyperæsthesia unrelated to any special nerve distribution and occasionally sufficiently extensive as to be of the boot or stocking type. In the variety known as acrocyanosis, the characteristics are a patchy deep cyanosis of the foot and possibly the lower third of the leg, increased sweating, coldness of the feet and various varieties of abnormal sensation.

Examination will usually produce some evidence of sympathetic imbalance. The affected foot is cooler. Cyanosis or pallor is present, also increased sweating, disturbed cutaneous sensitivity and possibly oedema of varying degrees. The arterial pulses in the leg are all palpable but decreased in amplitude and, if not examined with care, might be considered to be absent. However, repeated examination and the use of the oscillometer will correct this error. Trophic changes in the soft tissues do not occur except in the late cases, especially of the Sudeck's type which also shows a peculiar spotty osteoporosis on x-ray.

The cause of these changes is not known. However, several hypotheses have been suggested such as a sympathetic imbalance of central origin affecting the peripheral circulation, or, in the post-traumatic type, due to a reflex originating in the affected area which

has its afferent fibres running with the somatic nerves (nocifensor fibres of Lewis), the neurons being in the posterior root ganglia and from here synapsing with the efferent sympathetic nerves. The variety of chronic arterial spasm in the involved leg following poliomyelitis tends to confirm this hypothesis.

The diagnosis is made more certain in a case of this group by a lumbar sympathetic procaine block. If sympathetic imbalance is the basis of the trouble, then relief of pain, increase in the pulsation of the pedal arteries and disappearance of the abnormal sensation should temporarily take place. The same effect can be obtained in some instances by the intravenous or intramuscular injection of tetraethylammonium chloride which produces a blockade of the autonomic nervous system.

Obliterative arterial disease.—In these cases intermittent claudication is a most constant symptom and pathognomonic of the condition. It consists of a cramp-like ache in the muscles of the lower leg, most commonly the calf, felt only on walking and sufficiently severe to compel a halt. After walking is resumed, the pain soon recurs and the onset is hastened if rapid or uphill walking is done. The distance covered before the pain appears indicated the degree of arterial blockage and varies from 50 feet in the severe cases to 500 yards in the minor degrees. Intermittent claudication may also appear in the thigh and hip region and, in such persons, a higher level of arterial blockage will be found than in those where pain is experienced only in the calf. A main artery block in the superficial femoral artery will give calf claudication, but when pain is felt in the thigh or hip the common femoral artery is always found to be occluded.

Other symptoms incident to occlusive arterial disease are coldness of the feet especially in cold weather, increased redness of the dependent feet and, in the more severe cases, pain in the foot or toes especially at night. This pain is probably the result of ischæmic neuritis (so-called rest pain). Severe trophic changes in the foot, non-healing infections or ulcers, a cyanotic toe or actual gangrene are the late manifestations. Examination of such a case should be carried out as previously outlined and, with such data, a diagnosis of obliterative arterial disease is easily made. The exact etiology is more difficult, but in the older

age group arteriosclerosis obliterans is almost certain to be the cause. Buerger's disease is seen in younger people, and post traumatic and post-infective thrombosis should be considered in all age groups.

NEUROLOGICAL LESIONS

Frequently patients are seen whose only complaint is pain in the leg. Usually there is some associated factor such as varicose veins on which the blame for the symptoms is laid. As mentioned previously, when the history is incompatible with the symptoms of varicose veins, then care should be taken to prevent overlooking the true cause. If the investigative routine is carried out, a neurological basis for the symptoms will be apparent.

Protruded intervertebral disc.—This syndrome is probably the most common in this group and is suggested by sciatic pain radiating down the posterior and lateral aspect of the leg, worse on coughing or straining. Chronic low back pain is a frequent accompaniment. Listing of the body either toward or away from the side of the lesion occurs often, and back movements may be limited and painful. Sensory changes and poorly defined muscular weakness in the leg are commonly found. The Achilles reflex is often weakened or absent. Such findings give a presumptive diagnosis which can be further investigated by more exact neurological methods. Tumours involving the cauda equina should be kept in mind as should spondylolisthesis.

MUSCULO-SKELETAL LESIONS

Flat-foot.—The differentiation between the symptoms of flat foot, foot strain and varicose veins may be difficult especially when both co-exist. Both conditions frequently exist in the overweight woman who has had several children. However, when flat feet are the principal feature, the symptoms are confined mainly to the feet with occasional radiation to the knees. Such symptoms consist of aching and tiredness of the feet with occasionally acute pain in various foot areas on walking. Nocturnal cramps in the feet are occasionally present but usually all symptoms are relieved by cessation of weight bearing. As can be seen, the complaints are similar to those of varicose veins but located in the feet rather than the lower leg.

The examiner should have this condition in mind especially in the large stout person who

is constantly on her feet. He should look for deformities such as calcaneus valgus with pronation of the foot and longitudinal arch flattening. The presence of abnormal callosities, indicating changed weight bearing should be noted, as is frequently seen in pes cavus and flexion contracture of the toes. Shortening of the tendo Achilles is found by inability to dorsiflex the foot to a right angle. The absence of thickened skin beneath the head of the first metatarsal is indicative of Morton's syndrome of hypermobile first metatarsal segment. When doubt exists as to the feet being the cause of the symptoms, a proper therapeutic trial should be carried out by correction of the foot abnormality. The coincident reduction of overweight is also indicated.

Osteoarthritis of the knees and hips.—This condition, affecting most commonly the knees, is seen in elderly fat persons the majority of whom have some dilated veins in the legs to confuse the diagnosis. When the symptoms result from osteoarthritis, the complaints are usually localized to the involved joint. The disorder is characterized by stiffness and aching especially in the mornings on getting out of bed, and usually eases somewhat after the joint becomes "limbered up". The pain is aching and boring, worse after prolonged activity or after resuming motion following sitting for any length of time. It may be sufficiently severe as to cause almost total incapacity. The joint is said to creak or snap and the symptoms are usually worse in damp weather. Examination reveals some soft tissue thickening of the joint area. Patellar movements on the femur are reduced and a mild degree of increased synovial fluid may be present. Local tenderness is variable and inconstantly placed. Painful restriction of flexion is present and, at times, gross crepitus on movement can be felt and heard. X-ray will confirm the diagnosis. The findings in lesions of the hip joint are somewhat similar, with restriction of full range of movement being the most definite sign.

LEG SYMPTOMS WITH ASSOCIATED SKIN LESIONS

The commonest causes of an indolent ulcer on the lower leg are varicose veins and a previous deep phlebitis, consequently it is natural for most patients showing an ulcerative or pre-ulcerative lesion on the leg to be sent primarily

to the vascular clinic. Although the determination of the etiology in the majority is simple, the occasional case may be perplexing.

Varicose ulcer.—The diagnosis of varicose ulcer is absolute if certain criteria are fulfilled. The ulcer is placed on the medial lower third of the lower leg and the patient shows definite varicosities involving the great saphenous system. Such varicosities must show a reversal of flow in this vein on standing. Healing following bed rest, compression therapy or obliteration of the veins is also confirmatory to the idea of chronic venous stasis as the etiological feature. An ulcer in the region of the lateral malleolus is rarely due to varicose veins unless incompetence of the small saphenous vein can be demonstrated. Occasionally the origin of the ulcer is due to localized trauma, the failure of healing being due to pre-existing varicose veins. In such a case the ulcer is situated at the original site of trauma and therefore may be in any location. Along the subcutaneous border of the tibia is most common.

Ulceration following deep phlebitis.—Chronic ulceration in any area in the lower half of the lower leg may result from a previous thrombophlebitis of the deep leg veins. The history in such a case is all important for diagnosis even though the phlebitis may have occurred many years before. A detailed history is therefore most necessary especially to determine that the phlebitis mentioned was not superficial in type and therefore has little bearing on the present ulcer. The following criteria are necessary to be certain of a previous deep phlebitis: a large swollen leg, including the thigh, occurred in the convalescence following childbirth, operations, especially abdominal, typhoid fever, pneumonia or other severe illness. Occasionally it occurred spontaneously. The patient was confined to bed for three to eight weeks, the leg was elevated and wrapped in hot compresses. Following resumption of activity, chronic swelling of the foot and lower leg occurred, slight in the morning after rest but increasing as the day progressed.

Evidence of chronic venous stasis is present on examination in the way of pigmentation, sclerosis of the skin and subcutaneous tissue, most marked in the medial lower leg, enlarged skin venules and possibly scars of previously healed areas of ulceration. The present ulcer may be single but is frequently multiple and

may be placed in any situation in the lower half of the lower leg. The involved foot and ankle region is enlarged from chronic oedema and venous stasis and the affected foot probably perspires more than the other. There is increased cyanosis of the affected leg on dependancy. True varicose veins may have preceded the phlebitis but are almost never the sequel.

Ulcers due to arterial ischæmia.—Ulceration from this cause other than on the foot is relatively rare. It occurs almost entirely in the older age group in the absence of varicose veins and with no history of a previous thrombophlebitis or evidence of chronic venous stasis. Trivial trauma is usually the precipitating factor. Examination in such a case will reveal chronic ischæmic changes in the toes and foot. The nails are dry and brittle, the skin is thin and atrophic with loss of elasticity, the subcutaneous tissue is decreased and the other signs in the way of absent pedal and leg artery pulsations, as previously described, are seen. The ulcer shows little or no evidence of healing and has a sloughy base and anæmic granulations. An elevated blood pressure is almost invariable and associated diabetes is common. This variety of ulceration is just another manifestation of the decreased tissue vitality incident to poor arterial blood supply to the limb.

MULTIPLE LOCALIZED AREAS OF SKIN AND SUBCUTANEOUS INDURATION WITH OR WITHOUT ULCERATION

These cases are relatively rare but, with the exception of erythema nodosum, are chronic and disabling, do poorly on expectant treatment and so eventually find their way to a vascular or dermatological clinic.

Phlebitis migrans.—The sex is predominantly male and the patient gives a history of repeated episodes of red, tender, painful, linear swellings occurring in any portion of the leg but usually just above or below the knee on the medial side. Both legs are commonly involved and sometimes the arms. The areas subside a few weeks later leaving an indurated cord in the subcutaneous tissue a few inches in length which persists for some months thereafter. Crops of these lesions appear periodically, most commonly in the autumn months. Examination reveals one or more reddened tender linear areas, longitudinal in course, oc-

cupying one of the segments of the great or small saphenous veins. The overlying skin is brownish red in colour, the subcutaneous tissue is indurated and in the centre can be felt a cord-like structure which is obviously a thrombosed vein. The areas are moderately tender. Careful search should be made for any evidence of arterial obliteration, as migrating phlebitis can be a precursor or concomitant finding in Buerger's disease. However, the majority of phlebitis migrans cases seen by the author have not shown early or subsequent criteria of Buerger's and have cleared following removal of some focus of infection, the most common of which is the tonsils.

Erythema induratum.—This condition occurs predominantly in females and is characterized by single, but more commonly multiple, painful areas involving the skin and subcutaneous tissue. The lower leg is more frequently involved than the thigh. The lesions are irregularly oval in shape, the skin is brownish red and firm and the underlying fatty tissue shows considerable induration. The areas are tender to palpation and, in their later stages, usually break down causing chronic ulceration. No gross venous or arterial abnormality is present in the limb. The condition is considered to be tuberculous in origin and the diagnosis is confirmed by biopsy, where the characteristics of a tuberculous granuloma are found. A careful search should be made for other evidence of tuberculosis elsewhere in the body.

Erythema nodosum.—This is an acute disorder associated with fever and general malaise occurring usually in younger people up to 30 years of age. It is characterized by nodules involving the skin and subcutaneous tissue varying in size from that of a pea to that of a fifty cent piece. These may occur on all extremities and also the trunk but are most common on the legs. They feel firm, are somewhat tender and vary from a pink to a purplish violet in colour. The main feature is that the original lesions subside and disappear in two to three weeks but others subsequently may occur in different locations. Ulceration in the involved areas does not occur and the entire illness is limited to six to eight weeks. *Erythema nodosum* is usually considered rheumatic in origin but may follow a severe case of one of the exanthemata especially in debilitated people.

SUMMARY

1. An attempt has been made to briefly outline the common causes for chronic leg disability as seen from the viewpoint of a peripheral vascular clinic.

2. The importance of a detailed history is emphasized, especially where a post phlebitis lesion is suspected. The methods of investigation are outlined.

3. Co-existing varicose veins frequently mask the true cause of the condition and the steps to arriving at a correct diagnosis are outlined.

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MEDICAL SHOCK AND DEATH FOLLOWING NEOARSPHENAMINE THERAPY FOR SYPHILIS

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WELL organized clinic and private practice routine in the management of syphilis rarely encounters immediate serious reaction from intravenous injections of arsenicals. However, when this reaction is fatal the magnitude of the tragedy and its rarity merit the report of such a case.

Stokes, Beerman and Ingraham¹ state:

"There is, however, much difficulty in distinguishing between avoidable and unavoidable morbidity and mortality. The administration of an arsenical to a patient with an obvious contra-indication may result promptly in death, not from the arsenical as such, but from its improper use. Such complications as pneumonia developing when drugs are given at the onset of an acute bronchitis; death from rupture of an aneurysm or from angina pectoris if treatment is begun without proper preparation; exfoliative dermatitis following a repetition of treatment in a patient who gives obvious warning signs that were overlooked; aplastic anaemia and fatal purpura developing under the same circumstances; death from a cerebral accident if an arsenical is given in a large dose to a patient with acute syphilitic involvement of brain (Herxheimer effect), cannot fairly be laid at the door of the drug. Such treatment reactions are not drug reactions in any proper sense, yet they are only too readily used by antagonists to discredit even the intelligent use of modern methods."

These authors state that: "the average risk of death (avoidable and unavoidable) ranges from between 1:7,000 and 1:11,000 injections

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in use of trivalent arsenicals. The unavoidable risk of death ranges between 1:56,000 and 1:162,000 injections. Good performance is estimated at 1:15,000 to 1:35,000 depending on material, system, dosage, etc."

CASE HISTORY

Mrs. F., a white woman aged 57, on June 14, 1947, while in police custody on the charge of "state of intoxication in a public place", was routinely examined by a venereal disease control worker, and showed a positive blood complement fixation test and 800 Kahn units.

Present illness.—On June 26, 1947, she reported to the Vancouver Clinic. A review of her previous record revealed that on June 9, 1931, she was diagnosed as primary syphilis, seropositive. Treatment consisted of 43 injections of novarsan from June 9, 1931 to June 30, 1933, and 9 injections of bismuth from April 12, 1932 to November 9, 1932. She tolerated arsenicals well. The blood Kahn remained positive, 4-plus, during the entire period of treatment and observation from August, 1931 to June, 1933. Complete investigation, commenced on June 26, 1947, showed a positive blood complement fixation and 2,000 Kahn units. A physical examination was entirely negative and a spinal fluid examination performed on July 2, 1947, showed a negative complement fixation 5 cells per c.mm., protein less than 15 mgm. per 100 c.c., and colloidal gold curve of 00000000. Our cardiologist after x-ray of chest, fluoroscopy, electrocardiogram and physical examination on July 9, 1947, found evidence of arteriosclerotic aortic and heart disease but no evidence of cardiovascular syphilis. The patient was diagnosed syphilis, acquired, late, latent, seropositive, and was placed on weekly bismuth subsalicylate 0.2 gm. intramuscularly for 10 weeks. On July 30, 1947, her quantitative blood Kahn showed 1,400 Kahn units, and the blood complement fixation was positive.

On September 10, 1947, neoarsphenamine was started cautiously. The normal dosage of neoarsphenamine is 0.3 to 0.45 gm., but due to the patient's age the dosage was reduced. She received neoarsphenamine 0.2 gm. on September 17. On questioning her on September 24, she said she was well and that she had tolerated past treatments well, so neoarsphenamine 0.3 gm. was administered. The patient showed no untoward symptoms while the injection was being given, 9.50 a.m. In about three minutes, however, she complained of some discomfort in the epigastric region and her face became very flushed. Her pulse became thready at 9.55 and 5 minims of adrenalin was administered by hypo. Five minutes later the consultant ordered adrenalin 4 minims to be repeated. Pulse was imperceptible, skin was cold and clammy. She complained of choking sensation (no vomiting) and abdominal pain. From 10.00 to 10.30 a.m. she had several involuntary stools. At 10.15 caffeine sodium benzoate was given by hypo and at 10.30 her pulse was still imperceptible, with apex rate of 150, so intravenous plasma 750 c.c. was commenced. At 12 noon the patient's condition had improved, but she remained quite cyanosed, so was transferred to the medical wards of the Vancouver General Hospital at 12.15 p.m. Examination showed cyanotic colour which was marked in the extremities. Radial pulse and blood pressure were not obtainable. Respirations were shallow and rapid. Apex rate was 120 per minute. Extremities were cold. The foot of the bed was elevated and oxygen administered by mask. Adrenalin minims 7 were given hypodermically and plasma, 400 c.c., intravenously. Her condition seemed to be improving, but pulse and blood pressure still were not obtainable. At 4.00 p.m. her face became ashen colour with deep cyanosis of extremities. She was semi-comatose with sighing respirations. Coramine ampoules ii intravenously and caffeine sodium benzoate ampoule i hypodermically were given. At 4.30, condi-

tion showing no improvement, adrenalin minims 7 hypodermically and B.A.L. 225 mgm. (2.2 c.c. 10% solution) were given intramuscularly. Oxygen was given continuously and plasma running slowly. At 6.15 p.m. in spite of further support with coramine and adrenalin, and artificial respiration, the patient died.

Post-mortem examination (17 hours after death, Dr. J. E. McDonagh).—The essential findings were as follows: There were numerous small subendocardial regions of ecchymosis. The myocardium and valves were not remarkable. The ascending thoracic aorta showed a moderate degree of atherosclerosis, scarring and linear fissures of the intima, suggestive of syphilitic aortitis, but there was no appreciable dilatation. The coronary arteries were widely patent throughout and revealed only minimal atherosclerosis.

The lungs showed marked generalized congestion and some oedema. The liver weighed 1,540 grams. The right lobe was deeply indented by scars which divided it into large irregular lobules, a typical picture of *hepar lobatum*. The parenchyma of these irregular lobules showed a normal architecture macroscopically. The left lobe was enlarged to about twice normal size.

The other organs including the brain showed nothing remarkable.

Histologic examination.—Sections from the myocardium of the left ventricle reveal small subendocardial haemorrhages which extend a short distance into the muscle fibres. The appearances are not otherwise remarkable. Sections through the thoracic aorta show a picture of syphilitic aortitis, with lymphocytic and plasma cell infiltration in the adventitia, and vascularization and scarring of the media. Sections of the liver show large dense fibrous tissue trabeculae containing many thin-walled blood vessels and a moderately heavy infiltration with lymphocytes and scanty plasma cells. The anatomic lobules are well preserved although showing a little periportal fibrosis and moderate dilatation of sinusoids. This is a picture consistent with *hepar lobatum* of tertiary syphilis. The spleen is congested with blood, this being particularly noticeable in the sinusoids. The Malpighian bodies are large and prominent. An especially striking feature is the very large germinal centre in many of these in which the cells are very loosely distributed, many having fragmented and pyknotic nuclei. There are fairly numerous macrophage cells present. These are the so-called "reaction centres" common in certain infections, intoxications and also described in anaphylactic reactions.

Sections of the mediastinal and retroperitoneal lymph nodes show well marked "reaction centres" similar to those seen in the spleen. There is also a moderate degree of hyperplasia of reticular endothelial cells of sinusoids. The kidney show only marked cloudy swelling of the proximal convoluted tubules.

The adrenals show marked fatty changes in the cells of the zona glomerulosa and somewhat less marked in the zona fasciculata and zona reticularis. One small lesion, just filling the high power field of the microscope, is found in the cortex and is probably a gummatous lesion. The centre is dense, amorphous, slightly eosinophilic material being traversed by several small strands of fibroblasts. This is surrounded by a zone of closely packed fibroblasts scantily infiltrated with lymphocytes. Sections of the brain show rather marked generalized vascular dilatation and minimal perivascular haemorrhages in scattered places. There is marked siderosis of the larger blood vessels in the region of the basal ganglia. In some of these vessels there is very marked thickening of the intima which reduces the lumen to as much as one-half normal diameter.

In summary, the pathological findings are: syphilitic aortitis, syphilis of the liver (*hepar lobatum*), small gumma of adrenal gland, fatty degeneration of adrenal cortex, subendocardial petechial haemorrhages, cerebral congestion, pulmonary congestion and oedema, "reaction centres" in lymph nodes and spleen, splenic congestion.

COMMENT

In individuals who have an almost immediately fatal outcome following trivalent arsenical, the following causes or explanations must be considered:

A. *Technical errors*: (1) *Acid arsphenamine*.—Little more need be said about this catastrophe as it is unpardonable, and the outcome is generally fatal in a patient who receives concentrated un-neutralized arsphenamine (606) in place of neoarsphenamine. (2) *Toxification of drugs*.—Possible cause of death in some instances, but it can generally be prevented by proper use of drugs as directed and proper storage, handling, etc. In clinical use this cause is often ruled out as other patients may have received treatment with trivalent arsenical from same container, and this was the case in this instance. (3) *Hurry and speed*.—The rates of injection must be as laid down by authorities on this subject. Some doubt does exist in certain schools that one can cause death by too rapid intravenous therapy with neoarsphenamine. However, alarming reactions can certainly result, especially the nitritoid reaction.

B. *Structural impairment*.—One must always consider a rupture of an aneurysm or the sudden occlusion of coronary vessels as cause of sudden death following neoarsphenamine injection in an individual with cardiovascular syphilis, when there has not been the usual precautionary preparation of the patient with a course of heavy metals, e.g., bismuth. A Herxheimer reaction in a vital organ such as the heart may prove fatal.

C. *Idiosyncrasy*.—True idiosyncrasy is extremely rare and generally related to technical errors or unfamiliarity with the drug.

D. *Nitritoid crisis* has been advanced as a possible cause of sudden death and it may be well to review it briefly. It is pointed out that it is possible to produce a nitritoid reaction in any patient being treated with neoarsphenamine merely by increasing speed of injection. The symptoms are (Stokes, *et al.*¹):

1. (a) Deep breath or two; (b) gulping two or three times in succession; (c) expression of anxiety or restlessness.

2. *2nd Stage*: (a) Suffusion of face—red blotching—late sign; (b) deep apoplectic flush and œdema of face and back with or without urticaria—flushing over body; (c) choking; (d) wheezing and stridor (asthma).

3. *3rd Stage*: (a) Unconsciousness—pupils dilated—eyes open; (b) pulselessness and collapse (rare); (c) slow recovery is rule.

However, Stokes, *et al.*¹ state: "we have never, however, seen or encountered a record of death from true nitritoid crisis". Moore² likewise states: "instances of death during nitritoid reaction have been reported but we have never seen one".

E. *Colloidoclastic shock* is some times advanced as a cause of sudden death and is described by Stokes, *et al.*¹ as follows:

"Colloidoclastic shock associated with acid arsphenamine administration and so-called arsphenamine collapse differs sharply from nitritoid collapse as it develops, in that in shock the patient is pale, pulseless and collapsed as compared to nitritoid where he is flushed, hyperactive, coughing, choking, with a bounding pulse that may momentarily collapse." Moore,² however, makes no mention of this phenomenon.

F. *Shocklike reactions (medical shock)*.—This is described by Moore² as a condition clinically similar to acute surgical shock, seen rarely in patients in whom intravenous injections of an arsphenamine have been given. This reaction has not been noted following use of mapharsen. In a report of three cases of medical shock following intravenous therapy with neoarsphenamine Weinberg³ states the type of shock produced by neoarsphenamine is:

"Characterized by weakness, grayish cyanosis, cold clammy skin, nausea and vomiting, collapse and syncope; the pulse is weak, rapid and thready or even impalpable; the blood pressure is lowered to alarming levels or even . . . unobtainable. There is rapid dehydration, diminished blood volume, increased blood nitrogen and some times anæmia. It is not relieved by use of adrenalin in contrast to nitritoid crisis."

None of the above three cases had a fatal outcome, although heroic efforts were necessary to prevent death. It is noted, however, that in all three cases the reaction occurred following the second or third intravenous injection in a neoarsphenamine series.

One case has been reported by Orr⁴ as medical shock following neoarsphenamine. The term medical shock was first used by Atchley⁵ to describe a state of vasomotor collapse not due to trauma. The features of medical shock produced by neoarsphenamine are very similar to those seen in more frequently encountered surgical shock. Both show a drop in blood pressure and increased hæmoglobin and erythrocyte count in peripheral blood. There is generally a dilatation of capillaries with resultant stasis of blood and lack of oxygen to surrounding tissues and a resultant disproportion between blood volume and vascular bed. Phelps⁶ and Helfors⁷ have each reported cases which had a fatal outcome

following intravenous neoarsphenamine. Both these could possibly be placed in the category of medical shock. It is at least suggested by experimental work of Hirano⁸ on adrenal glands in animals poisoned with arsphenamine that this reaction may be due to acute adrenal injury.

G. Arsphenamine reactions due to myocardial injury.—Moore² states that when large doses of an arsphenamine are given to a patient with cardiovascular syphilis, there may occur an immediate, very severe and often fatal reaction. This appears during the injection or within a very few minutes thereafter. It is characterized by fainting, ashy gray-green pallor, and profuse sweating; the pulse becomes rapidly imperceptible, the patient gives a few gasps and dies. Before the danger of intensive treatment of cardiovascular syphilis was appreciated, at least four deaths occurred in Moore's clinic. The electrocardiographic studies of Reid⁹ and Wilson¹⁰ and his collaborators have indicated that this type of reaction is probably due to the sudden production of ventricular fibrillation in an already damaged myocardium. Curiously enough, this difficulty is apparently confined almost exclusively to patients with pre-existing myocardial damage due to cardiovascular syphilis. It has not been observed in individuals with rheumatic, hypertensive or arteriosclerotic heart disease. This type of reaction has not been reported following mapharsen.

Stokes, *et al.*¹ described cardiovascular collapse which is characterized by greenish pallor or cyanosis with dizziness, sweating, low pulse, and feeble heart sounds in marked collapse. They further state that cardiac death after arsenicals without any technical fault or idiosyncrasy can nearly always be traced to pre-existing cardiac disease, usually syphilitic in character and involving coronary vessels, or may be associated with the effect of the therapeutic shock (Herxheimer) or aneurysm with resultant rupture and death. They emphasize that any history of alcoholism predisposes to reactions following intravenous neoarsphenamine.

In the case which we have described it was not until the third injection of neoarsphenamine that any reaction occurred, so we can assume that she did not have a Jarisch-Herxheimer reaction involving a vital organ, such as heart or brain, and which one would have expected after the first rather than third arsenical injection. Further, the post-mortem findings also

ruled this out as a possibility. It is interesting to note that a careful physical, fluoroscopic, electrocardiographic and roentgenographic examination failed to reveal any cardiovascular syphilis yet there was evidence of subclinical syphilitic aortitis at autopsy. The dramatic onset and the clinical picture of profound cardiovascular collapse with but temporary response to the heroic measures used to combat shock would indicate that this case could very well be ascribed to the rare cause of death following neoarsphenamine previously mentioned, namely, medical shock. The fact that the patient was an alcoholic is undoubtedly a contributory factor to this fatal reaction.

This type of reaction impresses us with the urgent character of treatment called for and the need and availability of adequate hospital care, as it is an emergency of utmost importance. Orr¹¹ feels that in cases where there is an element of doubt as to the diagnosis between medical shock and nitritoid crisis, failure to respond within two or three minutes to a single injection of adrenalin should support a diagnosis of medical shock. He further believes that cases of medical shock can be controlled at once by the introduction into the blood stream of a quantity of normal saline solution sufficient to fill the greatly increased area of the capillary vascular bed. The amount required may be very great. In his own case two litres were necessary to restore the systolic pressure to 60 mm. of mercury and Orr¹² mentions a case reported by Atchley (in which the shock was caused by a rattlesnake bite) where 7,200 c.c. of saline were given in the course of 16 hours. He recommends¹¹ that flasks containing normal saline with sterile sets ready for intravenous use should be available at all times at clinics for such emergency. We can but conjecture as to the results of earlier administration of B.A.L. This case received an injection of B.A.L. six and a half hours after onset of symptoms.

We hope that the time is not too distant when such tragedies will be averted. This hope is strengthened by the reports of low toxicity and minor reactions to the latest drug used in the treatment of syphilis, namely penicillin. As a direct result of the above case in the Division of V.D. Control, Department of Health and Welfare, Province of British Columbia, we have decided that all cases of known alcoholics with

syphilis shall be treated with either penicillin alone or penicillin and bismuth.

CONCLUSIONS

1. A middle-aged white female confirmed alcoholic, developed medical shock with a fatal outcome following neoarsphenamine therapy in the treatment of her syphilis.

2. Suggestions and recommendations are made as to the diagnosis and management of medical shock following neoarsphenamine therapy.

3. It is recommended that syphilis in a confirmed alcoholic be treated with penicillin alone or with penicillin and bismuth, but not with an arsenical.

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VIRUS INFECTIONS OF THE CENTRAL NERVOUS SYSTEM*

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VIRUS infections of the central nervous system present a major problem in many parts of the world and specially in North America. The most frequently diagnosed nervous diseases of virus etiology in this continent are poliomyelitis, equine encephalomyelitis, St. Louis encephalitis, lymphocytic choriomeningitis, rabies, and meningitis associated with mumps or herpes. With present facilities for rapid air travel it is quite possible, however, for cases of nervous

disease contracted in any part of the world to be seen by physicians in Canada and America. Unless such physicians are well acquainted with the whole range of neurotropic virus diseases, mistaken diagnoses may be made, and valuable specimens for laboratory tests may not be collected. Furthermore, such cases may come to be reported in the literature as suffering from "a hitherto undescribed infection", when in reality they are suffering from a disease well-recognized elsewhere.

My object in this paper is to mention briefly the recognized virus infections of the central nervous system that have been described in all parts of the globe; this will be done by discussing a simple scheme into which these infections can be classified. Laboratory tests are available for the diagnosis of many of these diseases; the present scope of these investigations has recently been outlined elsewhere (Rhodes, 1948).

At least 35 antigenically distinct strains of viruses can cause an infection of the central nervous system in man. Many of these viruses differ widely one from another in biological properties, but others are closely related. Of recent years, a number of studies have been carried out on the antigenic relationships of neurotropic viruses, and this information enables us to build up a reasonable classification. The methods used in these studies include complement fixation and virus neutralization tests, and cross resistance tests in immunized laboratory animals. However, a classification based on antigenic structure is of little value to the clinician, who requires something more practical, something that will help particularly in the differential diagnosis of an obscure case of nervous disorder of presumed viral origin. Accordingly, I have fitted the various infections of the central nervous system into a mainly clinical, pathological, and epidemiological framework, but it should be borne in mind that the primary basis of subdivision is antigenic structure.

The first and most obvious differentiation is between (a) those viruses in which nervous involvement is only secondary to a primary localization of the virus elsewhere in the body; and (b) infections due to the neurotropic viruses proper, where the primary localization of the virus is in the central nervous system. We shall concern ourselves, in this paper, chiefly with the neurotropes proper.

* Portion of an address given to the Montreal Neurological Society, January 28, 1948.

A. DISEASES WHERE NERVOUS INVOLVEMENT IS
SECONDARY TO PRIMARY LOCALIZATION
ELSEWHERE IN BODY

Encephalitis, meningo-encephalitis, or more diffuse involvement may arise as a complication of several virus diseases of man: dengue; glandular fever; herpes febrilis (simplex); herpes zoster (zona); infective hepatitis; influenza; lymphogranuloma inguinale; measles; mumps; rubella; sand-fly fever; vaccinia; variola; varicella.

The clinical evidence of nervous involvement is usually apparent within one or two weeks after the onset of the illness. Occasionally, as in mumps, nervous involvement may appear before the primary lesions can be detected. Rarely, the nervous involvement may appear to be the only manifestation of infection, although here it would seem probable that a primary focus is present in the upper respiratory tract.

Histologically, the lesions produced by certain of these viruses are practically identical, and perivascular demyelination is frequently found. It must be emphasized, however, that there are few reports of the histological picture produced by many of the above agents. It is to be noted that these viruses do not cause epidemics of nervous disease, and the occurrence of nervous involvement is essentially an unexpected complication, presumably due to some peculiar combination of circumstances in the particular host. These viruses, with the exception of that of herpes febrilis, do not behave as true neurotropic agents on inoculation in experimental animals.

B. DISEASES WHERE NERVOUS INVOLVEMENT IS
PRIMARY — TRUE NEUROTROPIC INFECTIONS

There are a large number of viruses that can be properly described as "neurotropic". In man, the characteristics of a neurotropic infection are that the presenting symptoms and signs are due to involvement of the brain or cord; other organs are not primarily involved. After entry to the human body by the respiratory tract, gastro-intestinal tract, or skin, neurotropic viruses reach the C.N.S. by a variety of routes. Some may spread along the axons of superficially situated nerve fibres (e.g., poliomyelitis). Others may spread along the axons of more deeply situated nerves (e.g., rabies). In other cases, virus is implanted by an insect bite in the blood stream, and after circulating localizes in the C.N.S. (e.g., St. Louis, Japanese;

and equine encephalitis). In experimental animals, neurotropic viruses rapidly reach the C.N.S. after inoculation by peripheral routes, and titration experiments show that the highest concentration of virus is in the brain or cord. Spread from the portal of entry may be by axons, or by the blood stream.

The primary neurotropic virus infections can be subdivided into several groups as follows:

1. Diseases where involvement is mainly meningeal.
2. Diseases where the anterior horn cells are mainly involved (poliomyelitis).
3. Infection by the rabies group of viruses.
4. Encephalitis lethargica (von Economo).
5. Mosquito-borne encephalitides.
6. The equine encephalomyelitis group.
7. Tick-borne encephalitides.
8. Epidemic encephalitides of unidentified etiology.

These various groups will now be discussed individually.

1. *Diseases where involvement is mainly meningeal:* (a) Lymphocytic choriomeningitis. (b) Pseudolymphocytic choriomeningitis. (c) Durand's disease. (d) Swineherd's disease (eruptive meningo-typhoid, *maladie des porchers*).

These infections, of which the first is the best known, present clinically as a "serous" meningitis, having a sudden onset and short benign course. Numerous lymphocytes are found in the cerebrospinal fluid. Lymphocytic and pseudolymphocytic meningitis are caused by closely related neurotropic viruses, and it seems that infection is usually contracted from house mice, the normal carriers of the virus. The two viruses are antigenically distinct. Durand's virus has only been isolated once (in Africa), and is probably of no general importance. Swineherd's disease is a prevalent infection in parts of Switzerland, France, and Italy, and appears to be contracted by handling sick pigs. The infection has been transmitted by means of filtrates of human blood. The virus has not been studied as regards its antigenic structure.

2. *Diseases where the anterior horn cells are mainly involved.*—Because of its characteristic primary attack on the ganglionic nerve cell, especially the anterior horn cells of the spinal cord, poliomyelitis virus is most suitably classified in a category by itself. A few years ago, poliomyelitis virus was thought to cause natural infection of man alone, and experimentally to be transmissible only to the monkey. Of recent years, however, it has become evident that there is a poliomyelitis

group of viruses, containing the following members (see Gard, 1943):

(a) Human poliomyelitis virus transmissible experimentally only to monkeys.

(b) Human poliomyelitis virus transmissible experimentally to mice, hamsters, cotton rats, and guinea-pigs, i.e., the Lansing, SK, and MEFI strains (Armstrong, 1939; Trask, Vignec, and Paul, 1938 a, b; Schlesinger, Morgan, and Olitsky, 1943).

(c) Miscellaneous strains such as the MM, recovered from animal and non-human sources (Jungeblut and Dalldorf, 1943, 1946; Toomey, Takacs, and Weaver, 1945).

(d) Mouse poliomyelitis (Theiler, 1934, 1937, 1941).

Only the first two infect man. The great bulk of strains of poliomyelitis virus isolated from the C.N.S., naso-pharynx, or stool of cases of abortive or paralytic infection can only be transmitted to the monkey. So few strains can be transmitted to rodents that this is of little practical significance.

The strains that have been isolated from human beings, that are transmissible to rodents, share antigenic components with the monkey-pathogenic strains. It is almost certain that there are antigenic varieties of human poliomyelitis strains, analogous, for example, to the types and strains of influenza virus. For technical reasons, it has not yet proved possible to investigate this problem; an enormous number of monkeys would be required, and the work could not be undertaken by one laboratory. Yet, much of our understanding of poliomyelitis problems depends on a knowledge of whether or not there are several antigenic varieties of virus, that may not give cross immunity one to another.

The disease of mouse poliomyelitis is of considerable interest. This virus, of which a number of different strains exist, is carried by the majority of adult laboratory mice and is excreted in their stools. In a small number of cases, in young animals, the virus causes necrosis of the anterior horn cells, with the production of flaccid paralysis. We have here an endemic infection transmitted by the oral route, in which only occasionally does the young susceptible non-immune animal develop paralysis (see also, Olitsky, 1939). Although it is tempting to argue by analogy, it is probably unjustifiable to draw too many conclusions regarding human poliomyelitis from the mouse disease. It is a matter for speculation whether certain types of polyradiculitis or polyneuritis (e.g., Guillain-Barré syndrome) may not be due

to a virus allied to that of poliomyelitis, but there is no experimental evidence in support.

3. *The rabies group of viruses.*—Rabies attacks many animals and man; and the essential characteristics of the disease are similar in different hosts. A number of different strains of rabies street virus exist. (a) *Renforcé* strains. (b) Trinidad rabies virus (also *mal de caderas* in bovines). (c) Ordinary strains of street virus. (d) *Oulou fato* virus.

The majority of these street strains can be transformed, by passing in series through the brains of rabbits, into the laboratory virus known as *virus fixe* or fixed virus. *Renforcé* strains have an unusually high virulence for laboratory animals, and infections are characterized by a short incubation period. It has not been settled whether these strains necessarily cause a more fulminant infection in man, but there is probably no correlation between the clinical picture in naturally infected man and experimentally infected rabbits. The Trinidad virus differs considerably from other strains, in that it is spread by vampire bats (*Desmodus rotundus murinus*), and in man causes an ascending Landry-like type of paralysis. The same virus causes rabies of cattle (*mal de caderas*). The virus of indigenous mad dog disease of Africa (*oulou fato*) is of very low infectivity to experimental animals, and probably man also.

4. *Encephalitis lethargica (von Economo).*—This disease had epidemic prevalence in the 1920's, but apparently is now seldom seen. Many investigations were made on the etiology, but no virus was isolated that was generally accepted as the causal agent. French workers isolated the virus of herpes febrilis from a few cases, and claimed that it was the causal agent. Many others, however, failed to isolate this virus, which at any rate is known to be commonly carried by many adults without the production of disease. Of recent years it has been shown definitely that the virus of herpes febrilis can cause encephalitis, but it seems that clinically and pathologically herpetic encephalitis can be distinguished from encephalitis lethargica. At the present, the only possible conclusion is that the causal agent of encephalitis lethargica awaits discovery. The disease presents distinctive clinical, histological, and epidemiological features, justifying classification in a category of its own.

5. *Mosquito-borne virus encephalitis*.—*St. Louis encephalitis*, which is fairly widely distributed over the United States, is caused by a readily isolated neurotropic agent that is spread by mosquitoes such as *Culex tarsalis*. The virus causes infection also of domestic animals and chickens. It seems probable that the common cycle of the virus occurs in domestic animals and chickens, the transmitting agents being mosquitoes; chicken mites also transmit the infection (see Hammon and Reeves, 1945).

Japanese (Type B) encephalitis, which occurs throughout Japan and in the seaboard districts of China and Far Eastern Russia is also spread by mosquitoes. Until a few years ago, the disease frequently recurred in the summer months in Japan, involving hundreds of persons. Of recent years, for some unexplained reason, the usual picture has been of sporadic cases.

A number of other viruses have been isolated by yellow fever workers in Africa and S. America, and some, such as the *West Nile* virus, can certainly infect man. Hammon and Reeves have isolated a *California* virus that probably causes encephalitic infection in man. Investigations have shown that the Japanese, St. Louis, and West Nile viruses share antigenic components; this group can be differentiated from the virus of equine encephalitis (Kasahara, Yamada, and Hamano, 1937; Smithburn and Jacobs, 1942; Casals, 1944; Lennette and Koprowski, 1946).

6. *The equine encephalomyelitis group of viruses*.—Equine encephalomyelitis is also mosquito-borne, but it is more convenient to discuss this group of infections separately, as the equine viruses are distinct antigenically from the Japanese, St. Louis, and West Nile group. The following are the antigenically distinct members of the equine encephalomyelitis group: (a) European Borna disease of horses; (b) Russian equine encephalitis; (c) North American equine encephalomyelitis, Eastern type; (d) North American equine encephalomyelitis, Western type; (e) Venezuelan equine encephalomyelitis virus.

Only the last three are thought to infect man. The virus of Borna disease is antigenically distinctive (Howitt and Meyer, 1934), as is that of Russian encephalitis (Howitt, 1935, 1937). The Western and Eastern types of North American equine virus are serologically distinct, although there is some sharing of com-

mon antigens (Howitt, 1935, 1938; Records and Vawter, 1935; Shahan and Giltner, 1935; Havens *et al.*, 1943). A strain of virus closely resembling the Eastern type occurs in Brazil, and may be described as the Brazilian strain of the Eastern type (Carneiro, 1937). An Argentinian strain of the Western type has also been described (Rosenbusch, 1934). Neither the Brazilian nor the Argentine strains are thought to infect man. The Venezuelan virus is antigenically distinct from both the North American types (Beck and Wyckoff, 1938). It has been described also in Colombia (Soriano Lleras and Figueroa, 1942). Normally, the virus only causes infection of horses, but human disease has occurred in Trinidad (Gilyard, 1944). A number of laboratory infections have been reported (Casals, Curnen, and Thomas, 1943; Lennette and Koprowski, 1943).

7. *Tick-borne encephalitis*.—Two types of encephalitis are known to be spread by ticks: (a) Russian Far-Eastern spring-summer encephalitis. (b) Louping-ill. The Russian virus is spread by *Ixodes persulcatus* and perhaps other ticks, and involves man. There is a severe Eastern form of the disease, and a milder Western form (see Silber and Soloviev, 1946). The disease louping-ill is primarily one of sheep. It has been most studied in Scotland, but probably also occurs in Russia. The Russian encephalitis and louping-ill viruses are closely related (Casals and Webster, 1943, 1944; Casals, 1944). (c) Colorado tick fever, although it appears to be mainly a blood infection, has symptoms suggestive of nervous involvement.

8. *Epidemic and sporadic encephalitis of unidentified etiology*.—Various outbreaks of encephalitis have been reported in which it appeared likely that a virus was responsible. However, for various reasons no special studies could be made. For example, such outbreaks have been reported from Central Africa (Charters, 1940; Berney and Gelfand, 1946); the Argentine (Valdes, 1943); Brazil (Di Lascio, 1943); Germany (Gildemeister and Haagen, 1940); India (Chatterji, Gupta, and De, 1945); Sweden (Möller, 1939); and Texas (Woodland and Smith, 1942). A particularly interesting occurrence was that of Australian X disease, from which no definite virus was recovered, although the histological appearances of the disease were not unlike those characteristic of louping-ill.

Finally, a few sporadic cases of encephalitis have been reported in which it appears probable that a specific virus was responsible: "inclusion" encephalitis is characterized by the presence of herpetic type intranuclear inclusions in the ganglionic cells of the cortex (Brain, 1943; Greenfield, 1943; Russell, 1943); a disease occurring in Russia has been named acute primary hæmorrhagic meningo-encephalitis, and a virus has been isolated (Margulis, Soloviev, and Shubladze, 1944); Horan *et al.* (1944) described two fatal cases in troops in N. Australia probably due to a neurotropic virus.

SUMMARY

The numerous viruses that can cause an infection of the central nervous system are discussed and classified into groups on the basis of antigenic structure and other properties.

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A MODERN APPROACH TO
PSYCHOANALYSIS*

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BY way of introduction some historic background is necessary, even if it is very slight. During the first thousands of years of civilization we had religion, ethics, superstition and philosophy, the latter mainly in the form of metaphysics. Mind and matter, or body and soul, were rigidly differentiated and whatever mental treatment there was, when not exhibited in the form of exorcism or incantation, was applied in a physical manner. The poor victim was subjected to beatings, chains, breaking on the wheel, casting into hot or cold water or witch-burning. This was not only for what we consider the psychotic, but for the neurotic as well, if they showed so little restraint as to talk or behave too much beyond the accepted norm. It was only the final century of that period that began to show a dawning humanity and understanding, when some degree of mercy was accorded to the poor wretches, as in Paris under Pinel, in York, England, and in Philadelphia, in particular, where the Quakers decided that these hapless creatures should be "treated as men and brethren".

And so we come to the middle of last century, when with the beginnings of scientific research, the industrial revolution and the progressive writings of Chambers, Darwin, Wallace and Huxley, and the evolution of the theory of evolution, that a spirit of crass materialism, or should I say of physicism, began to dominate the intellectual field to the exclusion of belief, so that the defenders of the latter were driven to the use of the opposing slogans of "What is matter? Never mind". "What is mind? No matter".

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At the beginning of the present century there was no psychiatry in fact or in name. There were institutions for the custodianship of the psychotic, more or less decent, generally less, but for the poor neurotics, if they could subsist elsewhere, there was not even that. It is true that a number of physicians dealing with these ailments in France, United States and England—in the latter notably Maudsley, Mercier and Ross—showed a kindly solicitude and advocated various physical or medical measures, but obviously their efforts never even grazed the core of the problem; there was no understanding. In fact I, myself, worked in a large institution, representative of many such in the United States, as recently as twenty-five years ago, when the craze for removal of focal infection was at its height, where hundreds of patients had everything removable removed and yet, in subsequent visits there, the surviving patients were still in the hospital, with their ailments unaltered, unless for the worse.

What then was the approach to the neuroses more particularly, early in the century, in the whole western European world? We do not have to stray far from home to find a typical example. Let us take our local hospitals in 1904. The neurotics were shunted as much as possible from one physician to another as nuisances. They were regarded as "functional", "hipped" (hypochondriac), "cracked" or "queer", and one of our teachers in a medical clinic used to separate the sheep from the goats, the organic from the neurotic, and the latter were classified as "too strong to work". And what sort of attitude would be bequeathed to the students, the coming generation of doctors, I leave to you to judge. Our medical mandarins then and for a long generation afterwards disdained, and certainly failed to understand the neurotics, but great was their satisfaction if they could find an exuberant tonsil, a questionable appendix or better still a budding gastric ulcer. Eureka! There was the cause of all the patient's symptoms. But these symptoms unmindful of the discovery remained even unto the third generation of ulcer operation. I, myself, have seen these patients who lived long enough continue to haunt the various clinics for another ten, twenty, thirty and even forty years, perhaps with various complaints, but with the same old ailment.

What was the answer? Those of us in the old neurological and other clinics were baffled by a total lack of understanding of anything except organic disease, and visited on the patients the resentment really due to our sense of frustration resulting from our own ignorance. Some of us, who were more humane or sympathetic or conscientious, gave more of our time and effort and tried to listen, in spite of our impatience. Some of those patients, with their endless and prolonged repetitions certainly sapped the very vitality of the physician and left him like a limp rag, because he had no tools, no real understanding and no adequate time to treat them appropriately. Then he shelved them off with the suggestion that they should be ashamed of themselves, that they should buck up, that they should get a grip on themselves, that they should forget it. Finally they were given some assurance that they would get well and were sent out with a bromide mixture, or in later years with barbiturate pills. And so the cycle went, with the same patients, and with the constantly added new ones, throughout the ensuing years.

In the early years of the present century we began to read about a new school of mental treatment, called the Freudian or the psychoanalytic school. What we read then was criticism rather than matter, exposure rather than exposition. However, the very bombardment of criticism, mainly the bombardment of the emphasis placed by that school on sex, and above all on infantile sexuality, stirred both the lay and the medical mind and forced the attention of every physician dealing mainly with mental illness. On the part of the school there were articles and case reports, each later one seeming to that early post-Victorian era, more outrageous or preposterous than the one before. But in spite of the intrafraternal quarrels or defections, such as those of Jung, Adler and Rank, a definite creed and ritual were being laid down by Freud and his earlier disciples. That creed or formulation began to take shape as a new philosophy, which professed to show the actual workings of the human mind, and to eager eyes presented a dawning hope, that it, for want of something better, might at last lead to an effective treatment of mental illness.

We are all familiar with the lofty disdain and even truculent contempt displayed by

those outside the cult. The Freudians partly justified this by their extravagant assertions; in addition they were accused of claiming to cure almost every organic ailment of the body, as well as the functional ones, by this new-fangled method. The outsiders in their antagonism went farther and farther to the extremes of organic causation and treatment. But the revelations of psychoanalysis could not forever be kept at bay, so that some of these outside critics began grudgingly to nibble at the bait. They began to introduce some of these methods of approach such as analysis of dreams, free association, controlled association, more careful enquiries as to what the patients felt and thought about their feelings; whilst in general they continued to criticize the Freudians in their books and articles. Of course, there were a number of honorable exceptions such as Jelliffe and White, or Church and Peterson, and the latter in the first decade of the century already incorporated in their book a two-page presentation of the Freudian theory, in an experimental but hopeful way.

But there was a humorous fringe to this. It began to be obvious that "that" man and his theories could no longer be ignored, so other textbooks began to incorporate more and more of the psychoanalytic principles and less and less of the credit was attributed to where it properly belonged. So it was that Hurst, about 1920, in his article on the treatment of shell-shocked soldiers in "Nelson's System of Medicine", while displaying strictly Freudian procedures, had the hardihood to say that though people might consider his method "psychoanalysis" he preferred to call it "psychical analysis". Similarly, to this day, others, using the same technique, hypocritically prefer to call it "psychological analysis". In fact, in one issue, late in 1947, of the *Journal of the American Medical Association* two otherwise excellent articles on mental or psychosomatic disease, while obviously using the Freudian technique, pointedly avoid the mention of Freud's name or method. Finally, at this date it is interesting to note how thoroughly the ideas of Freud have been integrated into textbooks of psychology, sociology, psychiatry, medicine and even into religion, in some cases without a hint of his name or method. In those cases does it mean that the ideas have been too long and too well integrated in learned works, or that there still exists a "Freudian re-

sistance" so that his name and his general philosophy are still anathema?

Let us now consider some of the attitudes of modern psychiatrists who professedly are not adherents to the cult of psychoanalysis. Generally they give a very fair presentation of the theories, principles and *modus operandi*, proceed to advance their criticisms of the method, especially in relation to some of the underlying dogmas, mainly that of infantile sexuality, and end up by denying its value or validity, or damn it with faint praise.

Let us illustrate the above by two examples of modern psychiatric textbooks, namely those of Kraines, and of Henderson and Gillespie. From Kraines: *The Therapy of the Neuroses and Psychoses*, 1941, I quote as follows:

"Psychotherapy was formulated for many years before Freud, but he was the first to create a system of dynamics of mental life and to formulate a comprehensive theory on the laws of emotional expression in human beings. His formulation although generally recognized to be the most important initiator in the study of psychologic dynamics, has nevertheless been the subject of bitter controversy. Many authors insist that Freud has overvalued the undoubtedly important rôle of the unconscious, that he has over-emphasized the rôle of sex in the development of the human being, and that he has built a fantastic and scientifically unsupportable hypothesis on these exaggerations. On the other hand, his disciples insist that there is no other method of substantial value, which understands and formulates the laws of mental activity."

He further adds, "The patient who is being treated for a neurosis is analyzed an hour a day, five days a week, for a period varying from six months to three or four years. This time is spent in free association and in interpretation. Cures are not more commonly obtained by psychoanalysis than by eclectic psychiatrists, and what cures are achieved through the psychoanalytic technique occur because its therapeutic value lies not in its elaborate and questionable superstructure of concepts, but rather in four very simple elements. In the first place, the patient finds in the analyst a sympathetic, non-critical, listener. In itself, being able to talk freely, without fear of condemnation, serves to release tension. In the second place, the patient discusses his disturbing and distressing attitudes at such length and in such detail that he becomes desensitized to them. Third, through such discussion he learns to view his problems objectively, to lose his sense of guilt or self-blame. Finally, he comes to realize that his symptoms have little significance other than as the expression of underlying emotional problems. The understanding of the fact of an emotional basis is helpful, even though the theories about the fact may be erroneous."

To which the present writer's comment is, "Quite so! And who established these ideas but the authors of the psychoanalytic method?"

And now as to Henderson and Gillespie, in their *Textbook of Psychiatry*, 1941; they give much less space to the subject than does Kraines. On the other hand, they are much more impressed with it as a theory for interpretation of

the dynamics of the sick mind. Also while granting much more to its psychotherapeutic value, they very carefully quote the psychoanalysts, themselves, as to the types of cases to which the method is admittedly not applicable, but forget to refer to the much wider field to which it is. Finally, they emphasize the danger of such treatment in some cases, state that the treatment takes six years, and give some quotations to indicate that general, or shall we call it "eclectic" psychiatry is equally effective.

To conclude this part of our subject I would suggest that if the above authors and others of similar trend would peruse a few textbooks on mental diseases of pre-Freudian vintage, and then study their own books again, they would realize how insidiously contaminated are their own methods, techniques and interpretations, by the teachings of the Freudian school. It appears in some cases, that these contaminations give their books the only real validity they may possess.

And now we come to the psychoanalytic method itself. Space will not allow of a formulation of the psychoanalytic theory and practice as a whole; only some of the salient features can be touched upon. These have been concisely stated by some other writer as follows: The mental mechanisms of the neuroses are: external and internal conflict, inability to adjust to reality, regression to infantile ways, defensive symptom formation and escape from danger by means of a compromise reaction. Fundamentals of the theory of psychoanalysis are (1) theory of a dynamic unconscious; (2) theory of unconscious conflict; (3) theory of repression; (4) theory of a concept of infantile sexuality; (5) theory of transference.

Freud, Jung, Adler, Ferenczi, Abraham, Rank and, soon after, Jones, Brill, Alexander, and Oberndorf, to mention but a few names, in the course of a decade or two, had formulated a method; a ritual, with various hierarchies of interpretation, which seemed on the surface to be as rigid and unchangeable—even while in the process of modification—as the laws of the Medes and the Persians. But, granting its tremendous significance and value, was it so infallible? Poor Galileo, when he had to abjure his discovery that the earth revolves around the sun, is apocryphally reported to have risen to his knees and burst out with the exclamation "Eppur, si muove"—but it (the earth)

does move—so might it be said of the strict Freudians who will not allow the alteration of one "jot or tittle" of their law. Similarly, Wilbur and Orville Wright, at the turn of the century, invented a heavier-than-air machine that flew, contrary to the previous belief of us stick-to-the-earth individuals. Does anyone deny them the eternal credit of such an achievement? But does anyone today use a Wright machine of that vintage? In other words, modifications, omissions and advances on the older Freudian dogmas have made their weapon a more flexible, useful and utilizable tool, with no less credit and glory to the originators thereof.

What are the basic teachings of the Freudian school? (1) That all we are and all we evolve into as individuals is based on our constitutional predispositions and these latter obviously cannot be altered. (2) That the ontogenetic evolution of each of us during the infantile period may be modified for good or bad by environmental situations arising in infancy. (3) That where the outcome is maladjustment or neurosis, more favourable environmental circumstances in subsequent years, or psychoanalysis, by prying out the sources from the unconscious, may correct those faulty adjustments and make those individuals well.

In describing that evolution in infancy they speak of oral, anal, and phallic stages, at any of which the person may be fixated, with a consequent defect of personality and the appearance of symptoms. These symptoms persist or recur again and again in cycles, perhaps changing in form but maintaining the pattern, based on the period of arrest at the infantile pregenital or genital level. No kind of treatment is of avail that does not strip off layer after layer of reaction until the affected infantile layer has been exposed and explained—and, that psychoanalysis alone can do.

However, that method, called the dynamic one, requires, generally, three years or more of almost daily treatments of one hour each, and involves interpretations on the part of the analyst, which often may be incorrect and in any case are frequently unacceptable to the patient, and therefore are frequently ineffective. The length of treatment makes some dependent personalities more or less permanently dependent on the analyst, as on a father-image. The stock interpretations of symbolisms

forced on the patient are often inadmissible. Many of the adjustments, attributed to specific items into consciousness, and interpreted on the spot, are really due to other unrecognized items, i.e., conscious or unconscious apperceptions coming out of the catharsis insidiously, between visits to the analyst. In other words, improvement frequently goes on not in explosive, dramatic episodes as in the movies, but like the slow and almost imperceptible oozing out of an abscess; the patient often goes on improving without quite realizing how, when and why.

The above were my criticisms within the first few years of my experiments with psychoanalysis. They still remain. I concluded that that doctrine contained a vast fund of partial truths that had been treated as absolute truths; that the partial had been universalized and laid out as a sacred ritual. Whereas I found that each patient is a law unto himself, though many may fall into somewhat similar patterns. Thereupon, I made it a rule to intimate to the patient on the couch that no statement or question on the part of the analyst relating to the patient need be accepted by him; that they were merely suggestive, but could be accepted, rejected or mulled over by the patient. The result was that there were many acceptances, rejections or reservations on the part of the patient, which in the same or subsequent visits were accepted, after previous rejection or vice versa, so that ultimately the true substratum of fact crystallized out and came from the patient himself.

The quintessence of psychoanalysis is this: If the analyst implies by question or statement an unacceptable or offensive idea, the patient may shrink from it, consciously or unconsciously. Therefore, stimulating the patient to do the telling elicits the real truth, however offensive. Since it comes from the patient himself, it leaves no antagonism against the analyst. Moreover, the possibility of suggestion by the analyst is eliminated. And now for an "obiter dictum", a note by the wayside. I do not make promises to the patient. I explain to him that I am willing to take him on, but that contrary to the situation in organic disease, e.g., pneumonia or a broken leg, the doctor cannot cure him alone, but it requires the mutual co-operation of the patient and the analyst to do a good job. Finally, when the

patient begins to ask how he is getting along, I retort "I am not trying to tell you anything, I want you to tell me in detail how you are getting along,"—and thus—a fair and subjective picture from the patient is obtained. Finally, and this is anathema to a rigid Freudian, although admittedly the analyst should be dispassionate, it is frequently desirable for him to come down from his ivory tower, and display the fact that he is human too, with normal good will and genuine sympathy and understanding. Only too often have I come across cases where youthful enthusiastic physicians, who had recently rediscovered psychoanalysis—the simon-pure rigidly orthodox type—tried to force stock interpretations down the throats of un-understanding and resentful patients and left the latter sadder but not wiser men. In their enthusiasm these medicos had hitched their waggons to formulas and by-passed innumerable facts.

Although for some forty years I have considered ulcer as primarily of psychogenic origin, and was taught that asthma had a partially neurotic basis even before that, I have never been able to fit these or other psychosomatic groups or other syndromes (except the hysterical) to specific neurotic pathological states. Though tracing these physical symptoms would often lead to preceding layers of psychological sources in probing the mind, they were never found to be pathognomonic of specific personality patterns in themselves. Let us call the neurosis measles. Then the patient had measles; the patterns or arrangements of the spots meant nothing, except that the patient had measles. It was up to us to treat the measles by our general approach.

And now two questions arise. How pure is the writer's psychoanalysis and what is the average necessary duration of treatment? The two questions are closely interwoven. The writer has been exceedingly impure, and he regards the fact of these impurities, of which more anon, as well as his disregard for much of the interpretation, but not of the technique, as having tremendously shortened the duration of treatment, say from an average of three or four years to three or four months of daily sessions.

In *Deep Analysis* published by Berg a few months ago we have an excellent demonstration of a case treated by rigid Freudian rules. He states, "The difference between an intellectual

'analysis' and a real analysis is the difference between cant and life, ego and id, man and God—the difference between pretence and cure''. And in the particular patient he describes in that book, I am inclined to agree with his method. However, one statement meets with my entire approval—that an intellectual "analysis", i.e., where the kindly psychiatrist merely explains to the patient and reassures him again and again and gives him a pill, never cured an established neurosis.

Again, Jones in his *Papers on Psychoanalysis*, nearly forty years ago, thoroughly fought out the battle against the critics who stated that psychoanalysis was merely suggestion, by proving to his own satisfaction that it was the very antithesis of suggestion; that the dispassionate attitude of the analyst excluded such a possibility, but merely brought out the latent truth from the unconscious of the patient. And a very good case he made of it. But it is so absolutely true; can the analyst fail to feel the effects on the patient of his open or more subtle suggestions?

So now let us deal with some more of the writer's "impurities". In our own experience although the analytic technique is an absolute *sine qua non*, the added introduction, contrary to the Freudian dogmas, of correction of mistaken fact, the instillation of ideas, true, but unknown to the patient, advice, encouragement, persuasion, relaxation, and suggestion even to the point of hypnosis, may be adjuvants of considerable importance in any individual case. But let us emphasize the fact that it is the dynamic factor of the psychoanalytic technique that pries open the bars, allowing other psychotherapeutic procedures to enter. Unless that is done, they have no enduring value. Again, in tracing the ailments to their sources, it is often impossible and probably often unnecessary to lay bare all the layers of the patient's life to the period of infancy. Merely probing to the limits of conscious knowledge and understanding may elicit a sufficiency of factors buried in the unconscious and preconscious.

What do we aim at in treating the neuroses? The patient is either not at peace with himself or is otherwise miserable and unhappy. He is not at peace with his environment—he makes others unhappy. He is unable to do useful work—to get or hold a job. Any neurotic patient

may be troubled by any single one, or any combination of these factors, and our task is to eliminate them, by readjusting the patient's emotional life. But here again two elements are involved—a more or less complete readjustment of his inner conflicts and improved control as well. Obviously it is much better not to have any headache or heartache than merely to have control enough to pay no attention. However, it must be true that some of our reputedly cured patients may have been just sufficiently cured to control the residue.

What makes me refer to this is the fact that recently a patient, obviously immensely improved, after prolonged treatment, in a subsequent Rorschach test, still showed a tremendous dominance of the "id". Here is a still "native" personality, constituted of a primitive id, a fair superego and an ego with a thin cultural veneer, which I hope I have thickened to a considerable degree. Having given some idea of my impurities I can only add, that in general I have been very well satisfied, and, what is more important, the patients have been satisfied with an improvement, which so far in most cases, has persisted for many years, even though, at times my method has been criticized as a mere probe or trial analysis, whatever that may mean.

In the past decade, there have been evidences of hitherto strict psychoanalysts, for example, Oberndorf, Fromm, Horney, and others, showing a desire to modify the rigidity of the school. In any case, a year or two ago, I was greatly stirred by the appearance of a book, *Psychoanalytic Therapy, Principles and Application*, by Alexander, French, and many other collaborators from their school. In this work Alexander states that it is the result of an eight-year experiment in the search for a more flexible, a shorter and in general a more judicious procedure. He states that,

"The essence of psychoanalysis is to bring into the patient's consciousness, emotions and motivations, of which he is not aware," or in other words to extend the patient's control over his behaviour. This requires a thorough knowledge of the patient's personality structure. Further on he says "Freud's technique of therapy was inherited by his followers in a highly standardized form and used with little modification for almost forty years". And then a final quotation from Alexander; "It will be noted that in this volume we have not included a case treated according to the strictly classical psychoanalytic procedure. This omission is intentional, first because the psychoanalytic literature abounds in such presentations, and second because we have found in our studies that few cases, if any, require strict adherence to the standard technique throughout the course of treatment."

In any case, a careful study of that volume has demonstrated the Franz Alexander group's experimental discovery of a simplified and shortened technique and interpretation in the psychoanalytic procedure during the past eight years. It has been extremely gratifying to me to find that I have been using an almost identical routine for the past twenty-six years.

In conclusion, the writer has tried to point out modifications of the psychoanalytic procedure in cases of well-established neurosis, which, in his opinion, have shortened that procedure and made it more effective. With the help of psychoanalysis, he has been able to utilize other psychotherapeutic procedures, which he has found ineffective when used alone. He recommends these methods, because for many years they have appeared to cure neurotics under his care. Neurotics are unhappy in themselves, they make others unhappy, and frequently are unable to do productive work. In addition, they are often a life-long charge not merely on the neurological or psychiatric clinics, but, on account of their pseudosomatic complaints, on all the other clinics as well. They are therefore a terrific charge not only on the hospitals, but on the community, and on their families as well. I maintain that modified analysis, as described above, would be a very economic procedure from the standpoint of expense and unhappiness. Therefore, to point a moral and adorn a tale, I would suggest, as I have done for so many years, that every general hospital should have, say, twenty or twenty-five full-time psychotherapists on their staff, no matter what part of the community pays the piper.

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THE VAGINAL SMEAR TECHNIQUE FOR DIAGNOSIS OF CANCER IN THE FEMALE GENITAL TRACT

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NINETEEN years ago, Papanicolaou¹ first demonstrated his ability to recognize cancer cells in vaginal secretion. In 1941, and 1943, together with Traut, he published articles,^{2,3} and a monograph,⁴ describing in detail the technique and cytological criteria for recognition of cancer cells in smears of vaginal secretion. For

many years prior to this, however, pathologists had been examining pleural and ascitic fluids for cancer cells, with varying degrees of success.⁵ The principle of the vaginal smear rests upon the shedding of cells by carcinomas of endometrium and cervix into the genital tract, and recognition of these cast-off cells as neoplastic cells.

Since publication of Papanicolaou's monograph, his method of examining vaginal secretion for cancer cells has been investigated in several centres.^{6 to 13} The present review of the published data and the authors' experience is being made in an attempt to assess the method from the point of view of its accuracy, simplicity and practicability as a routine diagnostic procedure. Cytological diagnosis falls within the province of the pathologist, and the routine diagnostic pathological laboratory. It is imperative to our mind that a full evaluation of such a cytological procedure and its assignment to its proper level of significance in diagnosis should be attained as soon as possible. This report is not meant to be an attempt at complete evaluation of Papanicolaou's method, but to point out some of the difficulties encountered by the authors, and by others, in its use.

TECHNIQUE

As originally described by Papanicolaou,² the technique for collection of vaginal secretion is claimed to be very simple. With regard to the patient, it is required that no douche be taken and no examination of the genital tract be made within 12 hours of taking a sample. The vaginal secretion is aspirated by means of a clean, dry glass pipette with attached rubber bulb, from the posterior fornix. The secretion thus aspirated is spread on a glass slide with the tip of the pipette. The slides are immediately immersed in a mixture of equal parts of 95% ethyl alcohol and ether for fixation. This must be done immediately, before the secretion has a chance to dry. Staining of the slides may be done within 15 minutes, or at any time within the next two to three weeks. Papanicolaou's trichrome method, or simply hematoxylin and eosin may be used. Another technique has been used by Ayre.¹⁴ This consists of expelling the secretion from the pipette into a small volume of fixative in a test tube. The centrifuged sediment is subsequently embedded in paraffin, sectioned and stained in the same manner as a piece of tissue. This is a technique which has been successfully employed for many years in pathological laboratories in examining the sediment of pleural and ascitic fluids.

A refinement of the original technique has been described by Papanicolaou and Marchetti,¹⁵ and Cory.¹⁶ This involves taking swabs from the endocervix, and by means of a cannula inserted into the uterus, directly from the endometrium. Smears made from these swabs are treated in the usual manner. Ayre¹⁷ has introduced a further modification of the above technique. This consists of making smears from material obtained by scraping the surface of the cervix.

The equipment for the original technique consists of a pipette, rubber bulb, glass slides, and small bottle containing fixative, and is simple and cheap. The

secretion may be aspirated without inserting a speculum into the vagina, and the smears may be made by any physician in his office with minimal disturbance to the patient.

CRITERIA FOR DIAGNOSIS

Papanicolaou's monograph⁴ gives an excellent account, with beautiful illustrations, of the cytology of malignant cells. Gates and Warren⁶ in their evaluation of Papanicolaou's method give a review of the literature on the cytology of malignant cells, pointing out that it is fairly well established that there are recognizable differences in cancer cells which have been shed. Probably the most important of these criteria is variation in the nucleus and its relationship to the cytoplasm. As the characteristics of malignant cells have been excellently described and illustrated by Papanicolaou,⁴ Gates and Warren,⁶ and Meigs,⁸ they will not be reviewed.

REVIEW OF PUBLISHED REPORTS

In Table I, the total number of patients examined by the vaginal smear method is given,

follow-up of negative results. Jones *et al.*,¹¹ do not discuss follow-up of negative results. In those cases reported by Isbell *et al.*,¹³ every patient had uterine, cervical, and/or vaginal tissue sections. Percentage accuracy is not given by Gates and Warren,⁶ and McClure and Gattell.¹²

One of the most striking features of these results is the high degree of accuracy attained in the diagnosis of carcinoma of the cervix. This varies from 93 to 97.5%. With carcinoma of endometrium, however, the accuracy of diagnosis varied from 80 to 96%, with the majority of the authors achieving the lesser degree of accuracy. Besides the missed diagnoses, or false negative results, most authors list a percentage of false positive diagnoses varying from 1.7 to 8%.

In five articles, by Papanicolaou and Traut,⁴ Meigs,⁸ Ayre,¹⁸ Jones *et al.*,¹¹ Gates and Warren,⁶ a positive vaginal smear was the first indication of carcinoma of the uterus in 43 cases. These 43 cases were detected among a total of 8,010

TABLE I.

	Total number patients	Total number with carcinoma	*False positive diagnoses	†False negative diagnoses
1. Papanicolaou and Traut ⁴	3,014	179	Not given	Cervical carcinoma 3.2%
2. Meigs <i>et al.</i> ^{8, 9}	2,749	339	2.0%	Endometrial carcinoma. 9.3%
				Cervical carcinoma 3.5%
				Endometrial carcinoma. 20.0%
3. Ayre ¹⁰	580	100	8.0%	..... 4.0%
4. Jones <i>et al.</i> ¹¹	434	91	Not given	..... 7.0%
5. Isbell <i>et al.</i> ¹³	1,000	70	1.7%	Cervical carcinoma 2.5%
				Endometrial carcinoma. 16.6%

* False positive diagnosis—malignant cells said to be present in smear, but further investigation by biopsy, operation, etc., failed to detect any evidence of carcinoma.

† False negative diagnosis—no malignant cells found in smear, but carcinoma, proved (by biopsy) to be present.

together with the results obtained by the various authors. All the patients listed as having carcinoma had confirmation by biopsy of this diagnosis. Those patients having a vaginal smear positive for malignant cells were all thoroughly investigated, and where no evidence of malignancy was found, the result is labelled "false positive". In those cases where the vaginal smear failed to reveal malignant cells, but further investigation including biopsy showed carcinoma to be present, the result is labelled "false negative". It should be pointed out that Papanicolaou and Traut do not state that all of the 3,014 patients examined by vaginal smear had a complete examination including biopsy. In Meigs's cases, 36% of 861 cases had biopsies of cervix or of endometrium, or the whole uterus was removed. Ayre¹⁰ makes no mention of any

patients examined by vaginal smear. The neoplasms in these cases are classed as carcinoma-*in-situ*, or "hidden carcinoma". By the latter is meant an early, symptomless growth. In all of these patients the smear diagnosis was confirmed by biopsy. Isbell *et al.*,¹³ list 41 cases in which there were 20 proved cases of early carcinoma or carcinoma-*in-situ*, and 21 cases in which the tissue diagnosis was given as possible or probable carcinoma-*in-situ*. Table II below is taken from Isbell's report.

TABLE II.

	No. of cases	Positive smear	Negative smear
Definite carcinoma			
Cervix	13	8	5
Endometrium	7	1	6
Questionable carcinoma			
Cervix	13	4	9
Endometrium	8	0	8

In Table II, of 20 definite cases of very early carcinoma, smear diagnosis was correct in 9, or less than 50%.

In reviewing the published data one is struck by an outstanding inconsistency. The method of preparing vaginal smears is stated repeatedly to be a very simple office procedure, yet the interpretation of such smears is said to be a time-consuming task requiring special skill. With the objective of examining the method from the viewpoint of skill and time required in interpretation, simplicity as an office procedure, and practicability as a routine diagnostic procedure, the authors examined over 400 smears from 267 patients. This was done without any preliminary period of training other than reading Papanicolaou's monograph. The smears were numbered serially and examined without reference to clinical or other data. One of us had examined most of the smears previous to the present review, but had had no other experience or training. The smears were obtained from the Out-Patients' Department of the Ottawa Civic Hospital, and from physicians in the Ottawa district. A follow-up was obtained in 43 cases where the smear was thought to be suspicious or where carcinoma cells were thought to be present. In the remaining 224 patients, follow-up was incomplete in some, and not obtained in others. Table III gives the essential data with regard to these cases.

TABLE III.
VAGINAL SMEARS

Number of patients examined	267
Follow-up (biopsy, or autopsy)	43
Inadequate follow-up	224
Number of cases, carcinoma of cervix, confirmed...	18
Number of cases, carcinoma of uterus, confirmed...	2
Number of cases, carcinoma of cervix, not confirmed (Clinical diagnosis only)	3

The results of our examination of smears from 267 patients are most disappointing. They are based on the 43 cases which were investigated by means of biopsy. Of these 43 cases, 20 were proved to have carcinoma. Of the 20 cases of carcinoma, our smear diagnosis was correct in 12, or 60%. This, our highest degree of accuracy, was only attained after re-examination of all the smears. A false negative result was obtained in 8 cases of carcinoma (40%). False positive results, based on 43 cases followed, were 7 in number (16.3%).

Our results confirm what has previously been stressed many times by Papanicolaou,⁴ Meigs,⁸

and others. The cytological diagnosis of carcinoma of the uterus by vaginal smear is a highly specialized technique requiring special training and experience. The degree of experience required is illustrated fairly well in analyzing some of the published results. Papanicolaou had been examining vaginal smears for 27 years before publishing his monograph. Meigs *et al.*,^{7, 8, 9} have gradually improved their results over a period of four years. Gates and Warren⁶ state that although untreated low-grade malignancy of the cervix may be detected after a relatively short period of training, the smear diagnosis of certain types of carcinoma may prove difficult even after considerable familiarity with the method.

A very important factor in assessing the applicability of the method is the time involved in examining one smear. This may take anywhere from 15 minutes to 2 hours. It is the negative smears which are especially time-consuming, as every field must be examined. Furthermore, it has been shown by Meigs,⁸ and confirmed by our own experience that the accuracy of the method is improved if 2 or more smears per patient are examined. This, of course, greatly increases the time spent on each patient. The time factor alone is a very great handicap to the introduction of this method of examination into the pathological laboratory. The average hospital pathologist could not afford the time to examine more than the smears from one patient per day.

With regard to simplicity of the method as an office procedure, 25% of the smears received by the authors were classed as unsatisfactory because the physician had not immersed them immediately in fixative, or failed to spread the secretion on the slide. From our own experience, confirmed by others, it is apparent that Papanicolaou's method is not as simple as it seems. It is obvious that physicians can be trained to make satisfactory smears, but it is also obvious that the diagnostic pathological laboratory cannot hope to handle these smears in any quantity until additional specially trained personnel, including technicians and a pathologist are provided.

In attempting to arrive at an estimation of the accuracy of the method, the reasons for false positive and false negative diagnoses must be understood. As illustrated by our results, lack of special training and experience

may be a major factor. Reasons for false negative diagnoses may be as follows:

1. No cancer cells may be present in vaginal secretion. This will be particularly true in adenoma malignum of the endometrium. It is pointed out that 20% of carcinomas of endometrium were missed by Meigs,⁹ and his highly skilled group of co-workers.

2. Certain malignant tumours may shed very few cells, which will be so diluted by vaginal secretion that they escape detection in the smears. Examination of more than one smear, as stated above, does increase the accuracy of the method. It is reasonable to assume that a small, early carcinoma, and carcinoma-*in-situ*, may shed very few cells. Smears taken directly from endocervix and endometrium should increase the accuracy of the method in such cases, but this complicates the procedure.

It has been stated above that 43 very early carcinomas and carcinomas-*in-situ* were found by various investigators, but these were found in a total of more than 8,010 patients examined. Fremont-Smith *et al.*¹⁹ have recently reported the diagnosis of 12 additional cases of very early carcinoma by the smear method. There is no way of estimating though, the number of such cases which may have been missed by the vaginal smear method, because a large percentage of symptomless patients with negative smears did not receive further investigation. From the report of Isbell *et al.*¹³ the implication is that at least 50% of such growths may have been missed. Although it is established that the vaginal smear technique will detect early carcinoma and carcinoma-*in-situ* of the cervix, its accuracy in this regard is not yet determined. The absence of complete or long-term follow-up in patients with a negative smear detracts considerably from the claims made for accuracy of early diagnosis. The only justifiable, and certainly highly significant claim, is that a small number of early carcinomas and carcinomas-*in-situ* have been first diagnosed by this method.

3. The malignant cells which are shed may not be appreciably different from the normal, and may be very difficult to recognize even with a great deal of experience. This is noted by both Papanicolaou⁴ and Gates and Warren.⁶ It is particularly true with some carcinomas of the endometrium.

4. The malignant cells shed by some sloughing and highly malignant tumours may degenerate

rapidly and may not be recognizable in smears.

False positive diagnoses were not listed by all investigators. In reviewing those reports which did discuss this aspect of error, and in our own experience, chronic cervicitis, hyperplasia of endometrium, senile atrophy of endometrium are some of the conditions responsible for mistaken diagnoses. Radiation therapy may induce changes in epithelial cells, rendering their differentiation from malignant cells almost impossible. Gates and Warren,⁶ point out that atypical cells may be present in patients without evidence of malignant disease, five or more years after radiation treatment. Graham²⁰ discusses fully the changes induced in normal and malignant cells by radiation therapy.

Despite the confusing and often bizarre changes induced in epithelial cells by infection, atrophic and hyperplastic changes, and radiation treatment, the percentage of false positive diagnoses in vaginal smears has only varied from 2 to 8% in published reports. This is not a large error. The significance of the false positive diagnosis is that the patient may be subjected to the expense and disturbance attendant upon a thorough investigation of the genital tract for cancer. This criticism of the vaginal smear method is minor compared with the dangers inherent in a false negative diagnosis. A *negative report means only that no malignant cells were found in the smears examined*. It does not mean that the patient does not have a carcinoma in the uterus. We are convinced that early carcinoma of the uterus, including carcinoma-*in-situ*, may be first diagnosed by vaginal smear, but the percentage accuracy of the method in such early diagnosis is not established.

In the reports reviewed, there are various references to the relative merits of biopsy and vaginal smear as a means of diagnosis in carcinoma of the uterus. Those supporting the vaginal smear method cite cases in which repeated biopsy was necessary to find a very early carcinoma of cervix, whereas the first vaginal smear taken was positive for malignant cells. Te Linde²¹ reported 11 cases in each of which carcinoma was found only after the entire cervix was sectioned. Pund and Auerbach²² reported 47 similar carcinomas in 1,200 patients in whom hysterectomy was performed for reasons other than malignancy. Fremont-Smith *et al.*¹⁹ in reporting 12 cases of very early

carcinoma first diagnosed by vaginal smear state that initial biopsy failed to reveal carcinoma in 8 cases. Certainly the accuracy of biopsy in small early growths may be low. Much depends on the surgeon as well as on the manner of embedding and sectioning of the tissue. It is possible that the vaginal smear may be reliable in detecting very early growths, but it will not establish the diagnosis as a biopsy will. The report of Isbell *et al.*¹³ casts considerable doubt on the accuracy of the vaginal smear method in very early diagnosis. Despite the undetermined accuracy of this method, there is sufficient evidence to suggest that the vaginal smear may be of greatest value in detecting those very early growths which have not as yet produced symptoms. As pointed out above, 55 such very early growths have already been found by means of the vaginal smear. Ayre²³ has reported 19 cases of "precancer", which do not appear to fall into this category.

In the diagnosis of established carcinoma of cervix and endometrium, by which is meant growths which have passed beyond the very early stage, which are producing symptoms, and which may even be visible in the cervix, it is our conviction that the biopsy is still the most accurate means of confirming the diagnosis. Our reasons for this statement are that it is admitted that 20% of adenocarcinomas of endometrium may be missed by the smear method. Furthermore, some highly malignant and sloughing tumours including adenocarcinomas of cervix, and irradiated tumours, may be missed by the smear method. It is this group of tumours which constitute the 7 to 2.5% of known false negative diagnoses in carcinoma of cervix. The occurrence of false positive diagnoses also makes it imperative that biopsy be a prerequisite to surgical intervention. Because of inaccuracies in the method even in the hands of experts, we are of the opinion that the vaginal smear is as yet only an aid to diagnosis. A negative smear is of no significance whatsoever, while a positive smear requires confirmation by biopsy before any surgical procedure is undertaken. It is imperative that the practitioner be fully aware of these limitations of the method. He must realize that a negative report is no guarantee that the patient is free of malignant disease of the uterus. In our own experience, the patient

has often been told that this test has proved that she is free of cancer and has nothing to worry about. This is the last the physician sees of her, whereas she should be informed that there is no guarantee that she may not develop cancer within the next six to twelve months. The practitioner must also realize that a positive report indicates that further investigation is necessary, and not immediate operation.

As a procedure for screening large numbers of women for cancer, the present situation with regard to Papanicolaou's method has many dangers. We have clearly shown that it is not a simple procedure except from the viewpoint of the practitioner. Special training and a high degree of skill are required to interpret the smears. Because of this, and the time consumed in such examination, the pathological laboratory cannot accept such smears for examination without expansion of its facilities, additional technicians, and one person especially trained in this branch of cytology. Undue publicity of the method, with public emphasis on its simplicity will force laboratories to attempt to report on vaginal smears before they are qualified to do so, before the practitioner has learned the significance of positive and negative reports, and before the accuracy of the method has become firmly established.

In conclusion, it is urged that a more cautious approach to the vaginal smear method for diagnosis of cancer be adopted until it has been more thoroughly assessed, and until pathological laboratories have been able to acquire facilities and personnel required by this time-consuming method. A similar plea for caution is voiced in a recent editorial in the *Journal of the American Medical Association*.²⁴

SUMMARY

From a review of published reports, it is concluded that the vaginal smear method is established as an aid in the diagnosis of cancer of the uterus. In the hands of those skilled in its use, the accuracy in detecting carcinoma of uterus may be very high, but its accuracy in detecting very early, symptomless carcinoma of uterus is not yet established.

In an attempt to assess the degree of skill required, time consumed, simplicity and practicability of Papanicolaou's vaginal smear tech-

nique, over 400 smears from 267 patients were examined. It was demonstrated that preliminary training is essential, that the smears are not simple to interpret, that from fifteen minutes to two hours may be spent in the examination of a single smear. As a practical method for screening large numbers of women for cancer, there must be an expansion of facilities of the pathological laboratory, including trained personnel, before such screening would be possible.

The dangers of undue publicity of the method are pointed out, together with a plea for caution in the approach to this procedure for the diagnosis of cancer.

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ORAL ADMINISTRATION OF PENICILLIN

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PARTICULARLY in the last few years, it has been considered necessary to treat an appreciable number of patients with either repeated or prolonged courses of penicillin therapy. The physicians who have observed these cases, especially those in the surgical service, have formed the opinion that many such patients develop an unfavourable attitude to their treatment in general because of their fear

of constant injections. Lieut.-Col. G. H. Raymond, R.C.A.M.C., requested an investigation of oral penicillin with the object of establishing a system whereby such patients could be given at least temporary relief from the injections.

After it had been clearly established that an ordinary penicillin solution, when given orally, did not produce satisfactory blood levels,¹ various methods of oral administration were tried. Some methods advocated, such as the use of slow melting gelatin capsules or administration in oil, were soon discarded. The method of choice is now considered to be the administration of penicillin in a buffer mixture advocated by György *et al.*² Most commercial preparations are now modelled on this principle.

Little and Lomb³ reported satisfactory blood levels following the administration of penicillin mixed with egg. Their method was to give a teaspoon of sodium bicarbonate with one-quarter pint of milk, followed in ten minutes by the dose of penicillin dissolved in one or two c.c. of saline mixed with raw egg. If the mixture was found unpalatable, milk and sugar could be added. These investigators found that mixing the penicillin with raw egg made it more resistant to heat or alterations in pH.

Buchanan⁴ used this method of penicillin-in-egg administration for older children in whom free hydrochloric acid was present in the gastric contents, but the mixture proved nauseating.

The authors were interested in this problem in 1945, at which time trials were made in the Royal Canadian Naval Hospital at Cornwallis, N.S. In these trials, a form of egg nog and also amphotel were tried as vehicles, but the investigation was necessarily limited and conclusive results could not be established.

The experience in this hospital has been that adequate dosage of the commercial preparations of oral penicillin plus buffer, requires about 200,000 units every three hours. Many of the patients to whom oral penicillin could be given, are on high protein diets which include egg nogs or fortified protein drinks. For these reasons it was felt that the cheapest form of therapy might be the giving of an egg nog mixture in which low cost amorphous penicillin solution could be incorporated.

PRELIMINARY TRIALS

These trials embraced nine different methods of administration. The basic principle of each

method was the use of properly flavoured egg-nog as a vehicle for the penicillin, together with the use of sodium bicarbonate as a neutralizing agent for gastric acidity, plus controls without the use of a neutralizing agent. Doses were given every three hours. The results were as follows:

1. 100,000 units in 100 c.c. of egg-nog and one teaspoon of sodium bicarbonate—all mixed—2 trials. Levels were satisfactory, but not high; discontinued because of unpalatability.

2. 200,000 units—same system as 1—2 trials. Levels were good; discontinued because of unpalatability.

3. 100,000 units in 100 c.c. of egg-nog. One teaspoon of sodium bicarbonate dissolved in 50 c.c. of water given 15 minutes before penicillin drink—6 trials. This method was discontinued because of poor blood levels.

4. 100,000 units in 100 c.c. of egg-nog. One teaspoon of sodium bicarbonate given three minutes before penicillin—2 trials. Levels were good but not quite high enough and therefore it was decided to use a higher dosage.

5. 200,000 units in 100 c.c. of egg-nog. One teaspoon of sodium bicarbonate was given three minutes before penicillin—9 trials. Eight of the nine cases showed very good blood levels, but there were some complaints about the amount of soda, and since the trials using one-half teaspoon of soda were getting good results, this series with one teaspoon of sodium bicarbonate was terminated.

6. 200,000 units in 200 c.c. of egg-nog. One teaspoon of sodium bicarbonate was given three minutes before—1 trial. This method was discontinued because of epigastric distress.

7. 200,000 units in 100 c.c. of egg-nog without sodium bicarbonate—5 trials. This method was discontinued because of poor blood levels in the second and third hours.

8. 200,000 units in 200 c.c. of egg-nog without sodium bicarbonate—11 trials. Results of this method were considered to be quite good, but it was discontinued because the large volume of fluid caused epigastric distress.

9. 200,000 units in 100 c.c. of egg-nog. One-half teaspoon of sodium bicarbonate was given

TABLE I.
PENICILLIN BLOOD LEVELS, UNITS PER CUBIC CENTIMETRE
200,000 UNITS AMORPHOUS SODIUM PENICILLIN IN 100 C.C. OF EGGNOC
ONE-HALF TEASPOON OF SODIUM BICARBONATE GIVEN THREE MINUTES BEFORE PENICILLIN
GROUP 1, DOSAGE Q. 3 H., 20 TRIALS

Case	Hour 1	Hour 2	Hour 3	Hour 4	Remarks
1	0.48	0.12	<0.06	..	Levels after two doses
2	0.12	0.06	<0.06	..	" " " "
3	0.24	0.12	0.06	..	" " on fifth day
4	0.48	0.24	0.06	..	" " third "
5	0.12	0.24	0.48	..	" " second "
5	0.12	0.06	0.06	..	" " third "
6	0.06	0.06	0.06	..	" " second "
6	0.48	0.18	0.12	..	" " fourth "
7	0.12	0.24	0.06	..	" " first "
7	0.96	0.48	0.24	..	" " second "
8	0.18	0.06	0.03	..	" " " "
8	0.24	0.24	0.24	..	" " third "
9	0.12	0.12	0.06	..	Levels after two doses
10	0.48	0.48	0.12	..	" " on second day
10	0.48	0.48	0.24	..	" " seventh "
10	0.36	0.12	0.06	..	" " ninth "
11	0.48	..	0.24	..	" " second "
12	0.48	0.12	0.06	..	" " third "
12	0.18	0.06	0.03	..	" " fifth "
13	0.12	0.03	0.48	..	" " second "

GROUP 2, DOSAGE Q. 4 H., 7 TRIALS

Case	Hour 1	Hour 2	Hour 3	Hour 4	Remarks
14	0.12	0.24	0.12	0.06	Levels on thirty-third day
15	0.24	0.24	0.12	0.12	" " second day
16	1.00	0.24	0.06	0.03	" " after two doses
17	1.00	0.24	0.03	0.03	" " on third day
18	0.08	0.10	0.05	0.025	" " after two doses
18	1.00	0.12	0.04	0.03	" " on third day
19	0.50	0.12	0.03	0.03	" " eighth "

TABLE II.

PENICILLIN BLOOD LEVELS, UNITS PER CUBIC CENTIMETRE
200,000 UNITS AMORPHOUS SODIUM PENICILLIN IN 100 C.C. OF EGGNOG
ONE TEASPOON OF MAGNESIUM TRISILICATE GIVEN THREE MINUTES BEFORE PENICILLIN
GROUP 3, DOSAGE Q. 3 H., 6 TRIALS

Case	Hour 1	Hour 2	Hour 3	Hour 4	Remarks
20	0.24	0.12	<0.06	..	Levels after eighth dose
21	0.24	0.06	0.06	..	" " " "
22	0.24	0.06	0.12	..	" " two doses
23	0.24	0.12	0.12	..	" " on second day
23	0.24	0.12	0.12	..	" " eighth "
24	0.24	0.12	0.06	..	" " third "

GROUP 4, DOSAGE Q. 4 H., 7 TRIALS

Case	Hour 1	Hour 2	Hour 3	Hour 4	Remarks
25	0.48	0.24	0.12	0.06	Levels after seventeen days
26	0.48	0.12	0.09	<0.03	" " two doses
27	0.18	0.06	<0.03	<0.03	" " " "
28	1.00	0.24	0.18	0.09	" " on second day
29	0.72	0.24	0.12	0.12	" " fifth "
30	0.40	0.10	0.05	0.02	" " after second dose
31	0.40	0.10	0.05	0.01	" " " "

three minutes before the penicillin. This method proved satisfactory and was expanded into a representative experimental series.

For comparison during this preliminary period, blood level assays were done on patients receiving intramuscular therapy (4 cases on amorphous penicillin, q.3 h. dosage and 9 cases on penicillin in oil and beeswax).

EXPERIMENTAL SERIES

Forty trials were made.

Methods.—(a) An acid neutralizing agent was given three minutes before the dose of penicillin—27 trials using one-half teaspoon of sodium bicarbonate, mixed in about 50 c.c. of water. Thirteen trials using one teaspoon of magnesium trisilicate, mixed in about 50 c.c. of water instead of sodium bicarbonate.

(b) 200,000 units of amorphous sodium penicillin were dissolved in 10 c.c. of water and mixed thoroughly with 100 c.c. of eggnog. The patient took this drink quickly three minutes after the acid neutralizing agent. The eggnog mixture (not more than 1 day's supply) is kept refrigerated and the individual dosage of penicillin is mixed with water and added to the eggnog at the time of administration. The most satisfactory eggnog mixture consisted of six raw eggs beaten in one quart of whole milk with either maple or chocolate-peppermint flavouring added. The addition of sugar does

not affect the penicillin absorption. Each dose of penicillin eggnog contains 96 calories.

(c) Blood specimens were taken with sterile precautions and kept refrigerated until the assay was set up. Nearly all specimens were assayed within four hours and none were kept for longer than six hours. The method of assay was a modification of that recommended by Brewer and Reid.⁵ This modification is being described in separate articles.⁶ The patients did not raise any major objections to this system of dosage.

COMMENTS

The tables show the results of 40 trials. It will be noted that the left-hand column indicates cases. This is for the purpose of illustrating that in some cases blood levels are higher after the first or second day of therapy (cases 6, 7, 8, 10, 18). It was not possible to follow all cases in this connection because the penicillin dosage was being given therapeutically and not experimentally.

The tables of results indicate when blood specimens were taken in relation to the total period of therapy. It was not possible to show the relationship of specimen taking to the meal hours, but in three patients blood levels were repeated varying this relationship and no appreciable differences could be found.

Before the blood level technique was refined, it was not possible to measure blood levels

below 0.06 units per c.c., and therefore, some of the results are inconclusive insofar as it has not been possible to record the precise levels found. Cases 1 and 2 are examples. In these cases, the level at the end of the second hour compares favourably with other cases that have effective levels at the end of three hours, and therefore it seems fair to assume that all cases in Group 1 showed satisfactory levels over the three hour period.

The levels obtained at the end of three hours in Groups 1 and 2 are obviously comparable, and, by inference, it is felt that all twenty-seven trials may be considered as one group. The results in Groups 3 and 4 are self-evident, and these two groups also can be considered as one.

Five patients were maintained on this therapy for more than ten days. The carbon dioxide combining power and plasma chlorides were studied on two of these patients getting prolonged dosage, and no abnormalities were found.

CONCLUSIONS

Twenty-seven of the trials presented indicate that 200,000 units of amorphous sodium penicillin in 100 c.c. of egg nog preceded by one-half teaspoon of sodium bicarbonate gave effective blood levels over a period of four hours if the usually accepted criterion of 0.025 to 0.03 units per c.c. is admitted as the desirable minimum.

A smaller series of 13 trials using magnesium trisilicate as an acid-neutralizing agent did not give as satisfactory levels.

This study was made possible by the constant co-operation of Lieut.-Col. G. H. Raymond and Miss M. S. C. Holder, B.Sc. The authors also wish to thank the Resident Medical Officers, Nursing Sisters and Dietitian, whose assistance was essential.

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In planning for the future, it is important to realize that the elements of good medical care are not confined to the physician. Nursing is of the utmost importance in any program of health. Organized medicine would do well to give more attention to the need for greater co-operation between the medical and nursing professions. —Evan W. Thomas, *New York Medicine*, June 5, 1947.

SULPHA GRANULOMA—A NEW PATHOLOGICAL ENTITY

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SINCE the introduction of sulpha drugs it has become common surgical practice to dust some form of sulpha powder into surgical wounds where infection has occurred or is feared. Commonly sulphanilamide or sulphathiazole is used. The results surgically appear to be good in many instances and primary healing has resulted where it was thought to have been improbable without the addition of sulpha. However, many of these wounds subsequently develop tender areas and frequently discharge from one or more sinus openings. When the area is investigated surgically some granulation tissue is found and removed and when this has been examined in our laboratory a low grade inflammatory reaction is often present. In such tissues we have found a foreign body granuloma formation of the reticulo-endothelial type with no caseation but with crystalline foreign body inclusion in giant cells. This has been brought to the attention of our surgeons and the fact of the insolubility of sulpha powder in the tissues in at least some patients has been taken note of.

In the *Canadian Medical Association Journal* of November, 1947, there is a case reported as traumatic inoculation tuberculosis.¹ In this case sulphathiazole powder was introduced at operation and the wound healed but broke down again later. On operating again granulomatous tissue was removed resembling tubercle tissue but negative on culture and guinea pig inoculation. In the photomicrograph published with this article there appears to be a crystalline body in the lower giant cell of the illustration. The reading of this case report prompts the present communication.

In August of 1946 a married nurse noted a tender swelling of her left breast just below the nipple. She applied heat but the swelling did not resolve. She was admitted to a hospital on August 28 and the area was fomented for 2 days and on August 30 it was incised and a small bit of tissue removed for examination. A personal communication from the surgeon states "At the time I removed this specimen sulphanilamide powder was dusted into the wound". The biopsy report was "Chronic inflammatory condition. No evidence of malignancy." There was a serous discharge from the incision for a few days and then it closed.

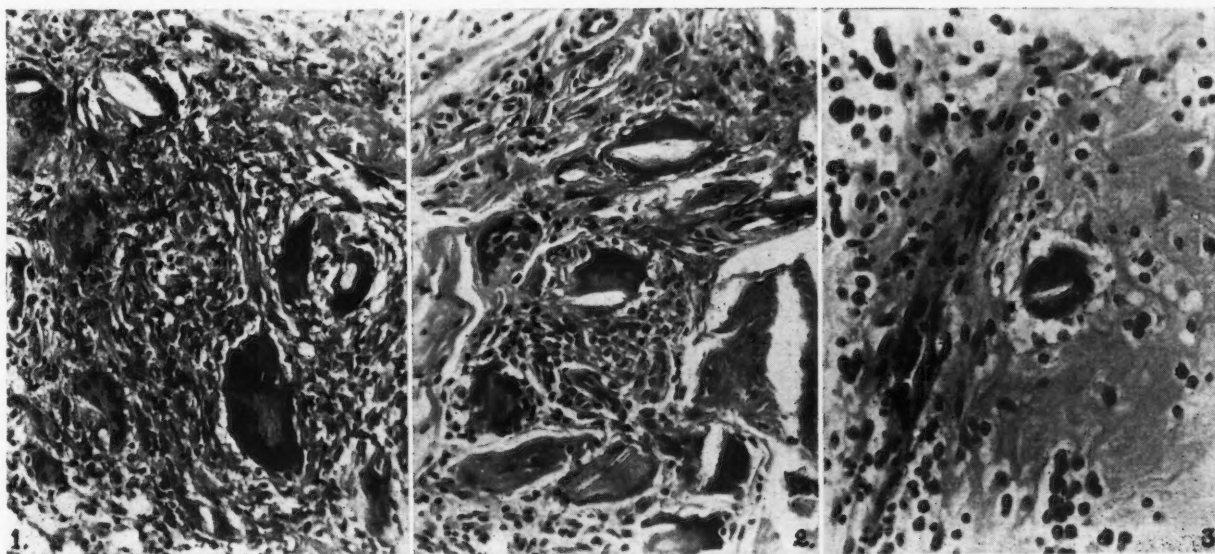
Subsequently the wound became tender and exuded a little serous discharge, healed, and again broke down with a small sinus opening. She was admitted to

Deer Lodge Hospital and the area was excised on October 26, 1946, with the diagnosis of breast abscess. The laboratory received 1 cm. of breast tissue in formalin with no abscess demonstrable. Tissue report: "Section shows a chronic inflammatory reaction with numerous small areas of granuloma. These areas are made up of pale collections of epithelioid cells surrounded by lymphocytes with some giant cell formation. Further study of sections and patient are indicated to rule out or confirm tuberculosis." Tissue having been received in formalin no culture or guinea pig inoculation was possible. Acid-fast stain did not reveal bacilli in the sections.

The incision healed but a small sinus again formed with a little serous discharge. Accordingly on November 9, 1946, a wider excision of the area was done and 3 cm. of breast tissue covered by a skin ellipse of 3 x 1.5 cm. including the sinus area was removed. Gross inspection showed a sinus leading from the skin surface to the centre of the breast tissue removed and ending blindly in a bulbous tip 0.6 cm. in diameter. Culture and guinea pig inoculation were negative for tubercle bacilli. Microscopic study report, "Section from the edge of the sinus shows chronic inflammatory

From the above history it is clear that no granulomatous appearance was found at the original tissue examination but such an appearance was found at all 3 tissue removals after sulpha powder was introduced into the tissues.

Reviewing our tissue diagnosis for the past year we find a dozen reports of re-amputations or re-operations where pain and/or discharge from a surgical scar has been present. In all of the group chosen definite crystalline inclusions are seen in foreign body giant cells. Such appearance has not been encountered in any case where there has not been a previous operation. Where records of the original operation were available it was found that sulpha powder was dusted into the incision before



reaction with lymphocytes, plasmocytes, eosinophiles, histiocytes containing blood pigment, and fibrosis. There are fairly numerous giant cells of the foreign body type in some of which colourless spicules are seen. There is no evidence of malignancy and no caseation. The tissue does not resemble tubercle formation."

The wound healed after this excision but again broke down with formation of a sinus exuding a little serum. On December 2, 1946, the area was again operated on and 2 small areas about 1 cm. in diameter were removed. The report on the microscopic study was as follows: "Section shows granuloma reaction with epithelioid cells and giant cells of foreign body type many of which contain crystals. These crystals are probably sulpha crystals". Diagnosis—sulpha granuloma (Fig. 1).

The wound was left open and healed from the bottom and on January 2, 1947, the patient was discharged apparently completely healed. It remained healed for about 7 months until late in July, 1947, when it again began to exude serous discharge. The patient was admitted to another hospital and a simple mastectomy was performed. Laboratory report showed a chronic non-suppurative inflammatory reaction with no evidence of tubercle or malignancy. The patient has since remained well.

closure. Photomicrographs of some of these tissues are shown herewith. (Figs. 2 and 3).

DISCUSSION

It is apparent that while the use of sulpha powder dusted into wounds at operation may not always produce granulomatous tissue reaction nevertheless in an appreciable number of cases it remains as unabsorbed foreign material and provokes a granulomatous tissue reaction. A somewhat similar reaction has been noted from lycopodium powder,² and also the so-called kaolin granuloma of intestinal mucosa.

The literature contains reports of careful studies and of personal experiences in the use of sulpha powders in wounds.^{3, 4, 5} In these exhaustive and very able surveys it has been shown that no benefit may be relied upon from the local application of sulpha powders in

wounds, fractures and burns. Our experience shows furthermore that a chronic granulomatous reaction may result and that in addition to being of questionable benefit the sulpha powder may be definitely harmful when used as local application in tissue wounds.

The case is reported in order that this possible reaction be in the mind of surgeons and pathologists when sulpha-treated incisions subsequently break down and that a sulpha granuloma be suspected as the true condition present.

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RESULTS OF SURGICAL TREATMENT OF CORONARY ARTERY DISEASE*

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CORONARY artery disease is becoming more prominent as a cause of death and disability. It is primarily a degenerative disease and its ultimate cure probably lies in the field of metabolism and nutrition. However, attempts are being made to improve the blood supply to the diseased heart by surgical means, and it appears worthwhile to review these procedures and to assess the end results.

The conception that the coronary vessels are end arteries must be discarded. Prinzmetal¹⁹ has shown conclusively that communications exist between the various branches of the coronary arterial tree and also between arteries and veins. In pathological conditions, the capillary bed in the myocardium can receive blood from the arteries, the veins or from the heart chambers via the Thebesian vessels.¹ Since there are no valves in these vessels the direction of flow may be in any direction depending on the pressure gradients established. It has long been known that the excised mammalian heart could maintain contractions on blood perfused through the coronary sinus even though no arterial flow was present.¹⁵ Many human cases have been reported in which the nutrition of the heart was adequate even

though both coronary arteries were occluded.¹⁴ It appears then, that there are sufficient collateral channels to maintain the nutrition of the heart even when the arterial flow is cut off. These apparently do not function adequately in many clinical cases of coronary artery occlusion.

In addition to the channels within the heart itself, extra-coronary collaterals exist in the mediastinal, bronchial and pericardial vessels and these can form connections with the coronary tree. Ordinarily such communications are small, but in cases of coronary occlusion they may contribute a large share of the blood reaching the heart capillaries.

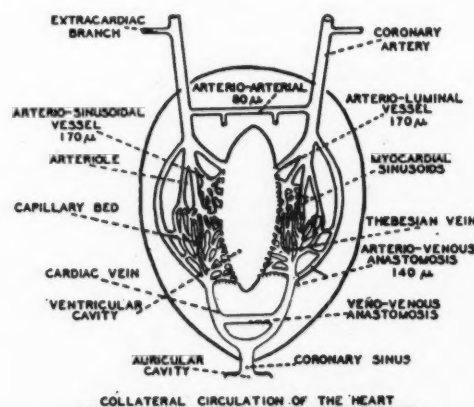


Fig. 1.—Diagrammatic representation of the collateral circulation of the normal human heart. All of these various collateral channels have been demonstrated anatomically. (Reproduced from the article of Prinzmetal, Simkin, Bergman, and Kruger, *Am. Heart J.*, 33: 420, 1947.)

The various methods employed in attempts to revascularize the myocardium may be summarized as follows:

1. *Development of collateral circulation by vascular grafts.*—(a) Pectoral muscle (Beck²). (b) Omentum (O'Shaughnessy¹⁷). (c) Internal mammary artery (Vineberg²⁴).
2. *Development of collaterals from cardiopericardial adhesions.*—(a) Asbestos (Beck²). (b) Aleuronat (Heinbecker¹⁸). (c) Talc (Thompson²²).
3. *Development of existing anastomotic channels within the heart.*—(a) Coronary sinus ligation (Gross, Blum and Silverman¹⁴). (b) Great cardiac vein ligation (Fauteux^{5, 6}).

It is difficult to assess accurately the results of any procedure designed to improve the coronary circulation. All of the operations have been carried out on patients with severe angina of effort and the criteria used by most authors to assess results are: (1) Freedom from anginal pain. (2) Increased ability to work. (3) Period of survival.

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Extra-coronary circulation.—The technique of vascular grafts to the heart to establish a collateral circulation has been well described by Beck.² He utilized pectoral muscle grafts and more recently, in addition created cardiopericardial adhesions with asbestos. He states that in experimental animals such grafts did indeed connect with the coronary circulation. The clinical results in a series of 37 patients treated by this method have been summarized by Feil.¹² In this group, the operative mortality was 37.8% and 9 patients had died since operation. Of the 14 patients who were alive at the time of the follow-up, 9 were able to resume work without symptoms and 5 were improved but still had some residual disability. Of the 23 patients who survived operation the results were classed as satisfactory in 19. In other words, 50% of the entire group submitting to operation benefited from the procedure, while 37.8% died as a result of it.

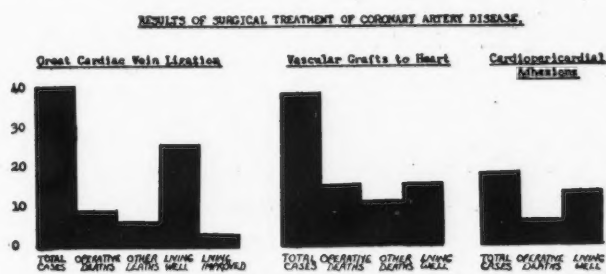


Fig. 2

O'Shaughnessy¹⁷ operated on a group of patients, grafting the great omentum on to the surface of the heart. He reported beneficial results but this series is too small to properly evaluate. Vineberg²⁴ has recently advocated implantation of the internal mammary artery into the wall of the left ventricle. The operation has not been tried on the human so that the results cannot be assessed.

Cardiopericardial adhesions.—Thompson and Raisbeck in 1942 reported a series of 16 cases of angina pectoris treated by the introduction of talc into the pericardial cavity. There were 4 operative deaths, a mortality of 25%. Of the surviving patients, ten showed marked improvement and 2 were moderately improved. This series is small and the follow-up is too short to estimate the value of the operation. The surgical procedure is simple but causes a severe reaction in the lungs and mediastinum and the mortality is relatively high.

Intra-coronary communications.—Gross, Blum and Silverman¹⁴ advocated coronary sinus ligation as a means of improving the blood supply to the heart, but this operation has never been tried on a human case. Their experimental work showed that the procedure was of value, but there were many bad effects. Because of these, Fauteux^{5, 6} considered that ligation of the great cardiac vein would be safer and give just as good a result. It has been shown that the immediate effects of great cardiac vein ligation are to produce a rise in the coronary venous pressure, an increase in retrograde blood flow, and a decrease in the oxygen content of the venous blood.¹³ In other words, it causes a reverse flow of venous blood through the myocardial capillary bed and the heart muscle has the ability to utilize oxygen from this blood. In addition, the raised venous pressure opens up the Thebesian channels and increases the size of the intra-cardiac collaterals.

The results of 40 cases of angina pectoris treated by this operation have been analyzed recently.²⁰ The operative mortality was 20% and 6 patients have died since. The results in the 26 surviving patients were classed as follows: *Group I.*—Patient free from symptoms. Able to return to former work, 19 cases. *Group II.*—Patient improved and able to work but still has some feelings of substernal pressure on severe exertion, 5 cases. *Group III.*—Patient still has anginal pain or congestive cardiac failure, 2 cases. Of all the patients who submitted to operation 72% benefited from the procedure.

The logical follow-up to the above procedure would be to introduce a source of arterial blood into the coronary venous tree in an attempt to supply the myocardium with freshly oxygenated blood. Since the coronary veins have no valves and do not seem to be involved in arterial disease, they appear to offer an excellent means of transporting the new blood supply to the heart muscle. It has long been known that the nutrition of the heart could be maintained by reverse blood flow.¹⁵ In 1942 Fauteux was able to anastomose the internal mammary artery of the dog into the coronary sinus and he found that such a procedure increased the survival rate following circumflex artery ligation. He reported this work in 1946.⁸ Further experiments in animals and human cadavers have indicated that this type

of operation does not appear to be technically feasible in the human at the present time.

Denervation of the coronary arteries.—The clinical course of coronary artery disease is complicated by the factors of vascular spasm and reflexes. Fauteux⁷ showed that ventricular fibrillation following coronary occlusion is a reflex phenomenon and is not primarily due to ischaemia. Leriche¹⁶ demonstrated that in sympathectomized animals the incidence of ventricular fibrillation following coronary artery ligation was less than in a control group. White²⁶ has advocated cervical sympathectomy and sympathetic block for the relief of anginal pain and he reports satisfactory results.

Fauteux and Swenson¹¹ demonstrated that pericoronary neurectomy was of value in preventing the onset of ventricular fibrillation in dogs subjected to coronary artery ligation. This procedure has been carried out on humans¹⁰ but the results are difficult to assess at present. It seems to be a reasonable assumption that these nerves will regenerate in time and experiments are being carried out at present, at the Experimental Surgical Laboratories of McGill University, to determine the rate at which regeneration occurs.

COMMENT

It must be recognized that no surgical procedure can replace the diseased myocardium or stop the progressive changes occurring within the coronary arteries. It has been shown, however, that it is feasible to add sufficient blood to the ischaemic areas of the myocardium to relieve anginal pain and to prevent or limit the extent of subsequent episodes of infarction. If the operative mortality is to be kept within reasonable limits in this group of patients a proper selection of cases must be made. Details of pre- and post-operative care must be carefully observed and the surgical procedure must be as technically simple as possible. The question then, is which type of operation offers the best prospects of relief from anginal pain.

To date, it seems that the best results have been obtained by great cardiac vein ligation. The effects have been satisfactory in 72% of the entire series. This operation aims at increasing the intra-cardiac collateral circulation by permanently opening anastomotic channels

which already exist in the myocardium. That such a phenomenon can occur is well established experimentally and the clinical results tend to confirm this opinion.

SUMMARY

1. The operations advocated for the treatment of coronary artery disease have been outlined.
2. The end results of the various procedures have been discussed.
3. Ligation of the great cardiac vein gives the highest percentage of beneficial results (72% of cases with a mortality of 20%).

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The quality of medicine which matters most is the preservation of high ethical standards and our acceptance of the responsibilities of freedom. Only to the degree that medicine keeps its own integrity can it ask or expect freedom. But the integrity of medicine demands, among other things, the highest possible quality of service to as many people as possible. Thus we are brought back again to the importance of organization. —Evan W. Thomas, *New York Medicine*, June 5, 1947.

OCULAR MANIFESTATIONS OF MYASTHENIA GRAVIS*

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SINCE Willis first described myasthenia gravis in the seventeenth century, increasing numbers of cases have been reported. It is not a rare disease, for several large series of cases have appeared in the literature. Rarely, however, are the manifestations confined to the eyes. Such a case forms the basis of this report. To facilitate the explanation of these manifestations, a brief review of the subject is presented.

Pathology.—Myasthenia gravis is characterized by an increased muscular fatiguability with a tendency to relapses and remissions. The fatiguability may be confined to, or predominant in, a particular group of muscles for a lengthy period. The most constant pathological changes are collections of small lymphocytic cells between the muscle cells, called "lymphorrhages". They may be present in muscles which do not exhibit myasthenia and are not always found in muscles which do show myasthenia clinically. They may also occur in organs such as the liver, spleen, kidneys and pancreas. The thymus gland is enlarged in about 50% of cases. The enlargement may be due to hyperplasia or a true neoplasm. A constant change is an infiltration of the thymus with lymphocytes.

Etiology.—The cause of myasthenia gravis is explained by the theory of neurohumoral transmission of nervous impulses. In 1921, Otto Loewi suggested that a chemical substance might be responsible for the transmission of a nervous impulse across a synapse in the autonomic nervous system. In 1936, Dale, Feldberg and Vogt demonstrated that acetylcholine is the mediator substance for the transmission of impulses from the motor nerve ending to the voluntary muscle cell. This site is called the myoneural junction. Further work demonstrated the presence of an enzyme, cholinesterase, whose function was to hydrolyze

acetylcholine into acetic acid and the very weakly acting choline. Cholinesterase is widely distributed in the blood and body tissues, and its action is very rapid. This enzyme limits the site of action of acetylcholine and also limits the duration of action of acetylcholine to a very brief period. When cholinesterase is inactivated, the action of acetylcholine is prolonged and intensified. The enzyme may be inactivated by physostigmine and by prostigmine.

Acetylcholine is the mediator substance between parasympathetic nerve fibres and their effector cells, namely, smooth muscles and glands. When acetylcholine is injected into the body, it stimulates smooth muscle cells and gland cells directly. In this respect it resembles the alkaloid muscarine and has been called the "muscarinic" actions of acetylcholine. Acetylcholine also stimulates autonomic ganglion cells in low concentrations and depresses them in high concentrations. In these actions, it resembles the alkaloid nicotine. Furthermore, both nicotine and acetylcholine have similar effects on skeletal muscles. For these reasons, the stimulating actions of acetylcholine on autonomic ganglion cells and on skeletal muscle cells, have been termed nicotinic. Atropine blocks only the muscarinic actions of acetylcholine. Curare blocks only the nicotinic actions.

In 1857 Claude Bernard found that mild curare poisoning will block impulses passing from nerve to skeletal muscle when both are capable of functioning. In 1934, Walker reported a case of myasthenia gravis with lid ptosis and weakness of the bulbar muscles. At that time it was thought that myasthenia gravis was due to a curare-like poisoning at the myoneural junction. Since physostigmine was known to be a partial antagonist to curare, Walker administered physostigmine to this patient. This resulted in a temporary improvement in the patient's symptoms, the improvement increasing with increase in the dose of physostigmine up to gr. 1/45, by injection. However the patient felt faint and trembled with this large dose. Then Walker considered the use of prostigmine, a drug similar in action to physostigmine. In 1935, Walker showed before the clinical section of the Royal Society of Medicine, two cases in which the most dramatic and complete relief of symptoms had been produced repeatedly by prostig-

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Presented in part by one of us (B.T.) before the Section of Ophthalmology, Academy of Medicine, Toronto, February 10, 1947.

mine. These findings were confirmed by Pritchard in the same year. From these observations has evolved the theory that in myasthenia gravis there is a deficiency of acetylcholine at the myoneural junction. Prostigmine inactivates cholinesterase and allows acetylcholine to accumulate and act over a longer period.

A subcutaneous injection of 0.5 to 1.5 mgm. of prostigmine methylsulphate and 0.6 mgm. of atropine sulphate forms a diagnostic test for myasthenia gravis. The principal results are the rapid removal of weakness of the skeletal muscles involved and a feeling of general well-being. The atropine is added to overcome the muscarinic effects such as pallor, sweating, diarrhoea and general collapse.

The clinical picture.—Clinically the onset is usually gradual. The increased muscular fatigability is most frequently first observed in the ocular muscles. Walsh stated that 25% of his series of 63 cases consulted an ophthalmologist first. Ptosis of one or both upper lids is the first symptom in over 50% of cases. Ptosis is soon associated with a varying degree of diplopia. Less often the bulbar muscles are first involved. The patient will complain of difficulty in swallowing or talking. Occasionally the symptoms are generalized at the onset. Characteristically the symptoms appear in the evening when the patient is tired, and disappear after the patient has rested during the night.

On examination unilateral or bilateral ptosis is seen frequently. Ptosis occurred in 54 of Walsh's series of 63 cases. Weakness of the orbicularis oculi may occur. Hence there may be both ptosis and inability to close the eyelids voluntarily. Weakness of the external ocular muscles is asymmetrical. One or all of the muscles may be involved and many combinations may occur. The picture may vary from day to day from a slight weakness to a total external ophthalmoplegia. Occasionally conjugate ocular movements appear to be affected, but more often there is no functional relationship between the muscles involved in the two eyes. Rarely there may be abnormal associated movements of the lids similar to those occurring as a result of misdirection of regenerated nerve fibres of the oculomotor nerve. (Edema of the lids is a rare prodromal sign, as is also retraction of the upper lid. The internal muscles of the eye are not involved and hence the pupillary light reflexes are normal. Paresis of accommodation is rare.

Visual acuity and visual fields are not altered. A case of myasthenia gravis may manifest itself only by its ocular signs and symptoms; it is then a case of purely "ocular" myasthenia gravis. Rarely it may remain as such. More frequently it will progress to involve other skeletal muscles, even after having been confined to the eye muscles for as many as twenty-five years.

The diagnosis rests upon demonstrating increased muscular fatiguability, by such movements as repeated opening and closing of the eyes to reveal a ptosis, or by repeated movements of the eyes in certain directions to bring on diplopia. The diagnosis may be confirmed by the response to prostigmine and atropine as outlined above. Walsh reports that in all of his cases with ptosis, improvement in levator action was evident after using 1.5 mgm. of prostigmine subcutaneously. The muscles attached to the eyeball are more resistant to prostigmine therapy than other skeletal muscles. Hence more than 1.5 mgm. of prostigmine may be required to improve ocular motility. Otherwise the diagnosis may be obscure. Failing the response to prostigmine, one may use quinine or curare. Both drugs increase the symptoms of myasthenia by blocking the transmission of the impulse at the myoneural junctions of skeletal muscles. In an adult one or two doses of 0.6 gm. of quinine will almost always suffice. Other diseases respond to parenteral prostigmine, such as amyotrophic lateral sclerosis, bulbar palsy, and some of the muscular dystrophies. The response, however, is minimal, ordinarily less than 5% and never over 10% of the effect seen in patients with myasthenia gravis.

CASE REPORT

The patient was a white male, 57 years old. He was first seen on admission to the Toronto Western Hospital on December 9, 1946. His complaints were a sudden onset of increasing diplopia for the past three weeks and drooping of the right upper lid for the past five days.

The patient was last in his usual state of good health three weeks before admission. He had had no complaints referable to the eyes and had been wearing a correction for close work. At that time he noted that he could not file metal objects properly because of blurred vision. This blurring progressed to double vision, one image being above the other. The diplopia increased rapidly and the patient was obliged to cease working five days later. About two weeks after the onset the right upper lid began to droop and very quickly progressed to the point where it obstructed his vision. There had been no previous episodes similar to the present one. He had no difficulty in chewing, swallowing, talking or breathing. He did not complain of any weakness of his limbs. Functional enquiry was essentially negative.

Physical examination was negative except for the ocular signs. His visual acuity was 20/20 in each eye with correction. The right eye showed a complete ptosis. The eye was abducted. There was inability to rotate the eye upwards, medially or downwards. The left eye showed normal levator action and movements of the globe were full. In both eyes, orbicularis action was present, there was no nystagmus, and corneal sensation was normal. There was no convergence. The pupils were round, equal, 3 mm. in diameter and reacted briskly to light directly and consensually. The media were clear; the fundus examination was negative. Peripheral and central fields were normal. Laboratory investigation revealed a normal blood picture, normal urine, normal roentgenograms of skull and chest, and normal spinal fluid.

A diagnosis of right external ophthalmoplegia was made. The causes considered were syphilis, neoplasm, toxæmia and cerebrovascular accident.

On the following day there were abnormal signs in the left eye. There was a partial ptosis, the palpebral fissure being 9 mm. vertically. There was paralysis of the internal rectus, the inferior rectus and the inferior oblique. There was partial weakness of the levator, superior rectus and superior oblique. The next morning the patient was seen immediately upon awakening. He was able to raise both upper lids well above the central visual area. He had some increased movement of both



Fig. 1

eyes. However, within one and one-half minutes the upper lids gradually dropped until there was a complete ptosis on the right side and a partial ptosis on the left. A diagnosis of myasthenia gravis was considered. On December 13, he was given a diagnostic dose of 1.5 mgm. of prostigmine methylsulphate and 0.6 mgm. of atropine sulphate subcutaneously. There was no apparent reaction and the diagnosis was doubtful. The diagnostic test was repeated on another day. This time he was given 1 mgm. of prostigmine followed by 0.5 mgm. every five minutes for two doses. Within 12 minutes the patient was able to raise both lids to almost normal height. He was able to move both globes horizontally and downwards over a wide excursion. There was no upward movement. The effect was maximal at the end of 30 minutes. Two hours after the injections the lids began to droop and the eye movements began to diminish. By three and one-half hours the eyes and the lids had returned to their previous state.

The patient was then placed on a daily routine of prostigmine bromide *per os*, potassium chloride and ephedrine. This routine afforded him only intermittent periods of freedom from symptoms, lasting about fifteen minutes. To produce more continuous relief, the prostigmine was gradually increased to 360 mgm. daily. This amount resulted in good ocular motility through the

day, but it also produced diarrhoea, cramps and cold sweats which were not controlled by atropine. The prostigmine was then decreased.

The patient was considered a suitable candidate for thymectomy. On February 25, 1947, thymectomy was performed. The anterior mediastinum contained an irregular fatty mass extending from the level of the fourth costal cartilage to the isthmus of the thyroid gland. It was not obviously bi-lobed nor did it contain any tumour visible or palpable. This mass was removed with relative ease. Microscopic sections revealed adipose tissue containing scattered collections of lymphocytes and an occasional Hassall's corpuscle surrounded by lymphocytes.

Shortly after the patient regained consciousness there appeared to be a definite improvement in the ocular signs. The improvement continued and was maintained. Prostigmine therapy was discontinued without adverse effect on the eighth postoperative day. Convalescence was complicated by thrombophlebitis in the right calf and also by a small serous effusion beneath the wound communicating with a similar collection of fluid in the anterior mediastinum. These complications responded rapidly to appropriate therapy. The patient was discharged on the twenty-second postoperative day. When last seen on April 11, 1947, the patient exhibited full normal range of ocular motility with normal lid elevation in each eye.

DISCUSSION

Thymectomy, ephedrine and potassium chloride have been mentioned. The presence and possible relationship of a thymus tumour in a patient with myasthenia gravis was first reported in 1901. This observation was subsequently confirmed by many writers. A few unsuccessful attempts were made to remove the thymus gland. In 1936, Blalock reported the first successful operation of total thymectomy for myasthenia gravis and eight years later he had completed 20 such operations. Keynes of London, England, has reported 51 thymectomies for myasthenia gravis since 1942. From a comparison of the results of these two surgeons, the following conclusions and approximate percentages may be drawn: (1) A thymic tumour is found in 10% of cases coming to operation. (2) The operative mortality of thymectomy is 15%. (3) Following operation, 50% are markedly improved, 35% are improved to a varying degree and 15% show no improvement. It must be emphasized here that both Blalock and Keynes have avoided operation on patients with mild symptoms almost completely controlled with the aid of prostigmine, and that the operation was not denied to those with severe symptoms who were very poor operative risks.

Following thymectomy the patient herein reported appears cured. However it is possible that the disease has undergone a natural remission. Hence a critical decision on the value of

the thymectomy cannot be made until more time has elapsed.

Edgeworth, herself a victim of myasthenia gravis, accidentally discovered that ephedrine afforded her some symptomatic relief. Ephedrine increases skeletal muscle power in myasthenia, but the mechanism of action is unknown. Its effectiveness is about 10 to 15% of that of prostigmine. Ephedrine is a useful adjunct to prostigmine therapy. Potassium chloride has a mild beneficial effect. There is some experimental evidence that potassium ions strongly sensitize ganglion cells to acetylcholine. Furthermore Brown and Feldberg suggest that the discharge of acetylcholine may be effected by potassium ions mobilized in the passage of the nerve impulse. In 1935, with these data in mind, Laurent and Walther reported that potassium chloride in large doses produced demonstrable improvement in myasthenia gravis. It produces disagreeable symptoms when taken by mouth in effective doses. At present, potassium chloride is also a useful adjunct to prostigmine therapy.

CONCLUSIONS

1. The manifestations of myasthenia gravis may be confined to the eyes and adnexa.
2. The muscles attached to the globe are resistant to prostigmine therapy. A dose greater than 1.5 mgm. of prostigmine may be required to produce a positive response for diagnostic purposes.
3. Myasthenia gravis should be included in the differential diagnosis of external ophthalmoplegia.
4. The exact relationship of the thymus to myasthenia gravis is unknown. However a patient with this disease may benefit from thymectomy.

We wish to thank Dr. R. C. Laird and Dr. J. C. McCulloch for their kind assistance in the preparation of this case report.

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AN ASSESSMENT OF THE RESULTS OF VAGOTOMY*

(Based upon personal experience of 66 cases.)

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IT is now about two years since we started doing vagotomies, and with an experience of 66 cases I feel it may be possible to pass judgment upon some of the results, even though sufficient time has not elapsed to permit anyone to guess what remote problems may yet develop.

Vagotomy abolishes the pain of ulcer, reduces the total volume of gastric secretion, brings about a state of achlorhydria and permits the inhibitor sympathetic nervous system to act unopposed upon the gastro-intestinal musculature, the augmentor having been severed.

The transabdominal route has met with almost universal acceptance as being more easily accomplished by the ordinary surgeon doing gastro-intestinal work. The original controversy as to the respective merits of transthoracic versus transabdominal routes has been settled in favour of the latter. There may be, however, isolated instances where an approach through the thorax may still be advantageous. Chest surgeons, loath to relinquish an operation of considerable simplicity, loudly proclaim its advantages, but the abdominal visual verification of the existence of disease, and the performance of other necessary surgical procedures weigh too heavily against it as an elective routine procedure.

For some time after Dragstedt's introduction of modern vagotomy, it was considered necessary to check the completeness of the operation by a gastric analysis done in hypoglycæmic states subsequent to the exhibition of insulin sufficient to cause the blood sugar level to fall below fifty. This proved frequently to be something of an ordeal, nevertheless, we faithfully carried this out on our first 23 cases. Twenty-two of these showed complete achlorhydria throughout the entire two-hour test period, the odd case showing a free acid of ten units on the fourth reading. We have in consequence abandoned this procedure, believing that vagotomy, thoroughly carried out, means complete subsequent achlorhydria of the neurogenic phase,

* Presented before the British Columbia Surgical Society, March, 1948.

and have reserved the insulin provocative test for doubtful or special occasions.

Of the 66 vagotomies, many results have been almost miraculous; many have been decidedly good, a few have given and still give concern, a few have been disastrous. Accustomed through the years to the smooth convalescence of gastrectomies I am at least able to say that these 66 vagotomies have given me more postoperative care and worries, have resulted in more work on the part of the postoperative staff than any other 66 of my most complex gastric resections. I believe that I have met with all the postoperative troubles that any other surgeon has encountered, gastric atony, bowel and gastric distension, nausea, hiccoughs, vomiting, diarrhoea and late obstruction.

Post-vagotomy diarrhoea has occurred in 23 of my cases. Its cause is unknown to me, but I believe that it must be of a neuro-muscular origin or possibly due to some as yet unrevealed change in pancreas, liver, or enteric secretions. It does not occur following gastric resection so

TABLE I.
VAGOTOMIES

	Cases
Duodenal ulcer	39
Gastric ulcer	13
Marginal ulcer	11
Differential section	3
	66

TABLE II.
POST-VAGOTOMY DIARRHOEA

Number of cases	23/66	34.8%
Duration:		
Less than a month	18/23	78.0%
More than three months ..	3/23	13.0%
Over a year	1/23	4.3%
Severe diarrhoea	5/23	21.7%

can hardly be of an infective nature due to elimination of the acid-sterilizing influence from the stomach. In two of my cases severe hypoproteinæmic states developed coincident with the diarrhoea, and proved to be well nigh irreversible. Large quantities of plasma, intravenous and oral amino-acids, had to be given over several weeks, but recovery occurred with dramatic suddenness in both instances, as though a backlog of tissue hypoproteinæmia had finally been overcome. Diarrhoea in one of these two cases subsided with the return of normal protein levels, the other more slowly. None of the remedies in common advocacy for post-vagotomy diarrhoea has had the slightest therapeutic effect. Urocholine proved valueless. Cessation occurs

as a result of some as yet uncharted restoration of neurocirculatory balance.

Two of my cases who had had severe diarrhoea developed late obstruction, five months and seven months respectively, one of these had had multiple previous laparotomies and might be excused, but the other was a primary operation. There would appear to be developing in the literature an increasing incidence of late obstructions—the sequence being epigastric fullness, distension, diarrhoea and obstruction.

TABLE III.
HYPOPROTEINÆMIA AS A RESULT OF POST-VAGOTOMY
DIARRHOEA

	Plasma protein percentage	Cell volume percentage
1947		
January 13	5.95	47.0
January 28 (Operation)	5.31	41.0
February 1	4.00	36.0
February 3	4.22	37.0
February 6	4.00	35.0
February 7	3.97	34.0
February 22	4.00	34.0
February 27	6.01	37.0
1948		
February 8	4.25	38.0
February 12	4.22	38.0
February 17	5.96	44.0

VAGOTOMY FOR DUODENAL ULCER

Why has vagotomy received such acclaim, particularly with respect to intractable duodenal ulcer, the surgical treatment of which had in recent years become so standardized and whose curability percentage had run around 90%? The answer is that the 10% who have not had such a desirable result following modern gastric resection or earlier gastroenterostomy were in worse shape than prior to their operation. The world has been looking for something which would bring a large measure of relief to these 10% of unfortunates.

The mobile, non-penetrating duodenal ulcer which has not bled has for long years been established as a medical, not a surgical problem, and represents 90% of the duodenal ulcers. But the penetrating ulcer with points of fixation to pancreas, bile ducts or adjacent viscera, with continued pain, resulting from hyperacidity, which has in the past been defined as an "intractable" ulcer, must be regarded as a 100% surgical problem. Around this ulcer for years has raged the controversy of ulcer resection, or resection by exclusion as advocated by Devine and Finisterer. There can be no doubt but that exclusion resection in which a pouch of antral mucosa is allowed to remain, has been proved to be a potent

source of marginal ulceration. It is equally certain that the need for exclusion resection decreases in proportion to the experience and ability of the surgeon. Most duodenal ulcers, while heavily indurated, are actually not large and can in the vast majority of instances be removed with sufficient duodenum distal to them to permit closure. If they are so far down that this is not possible then there is in the vast majority of instances sufficient duodenum above them to permit resection with complete excision of all antral mucosa. An ulcer, however, may be irresectable on the grounds of inadvisability rather than physical impossibility.

I have performed transabdominal vagotomy in 39 cases of intractable duodenal ulcer as recorded in Table IV.

TABLE IV.
DUODENAL ULCER

With gastro-enterostomy	33
With exclusion on resection	3
Gastric resection and differential section ..	3
	—
	39

Posterior gastro-enterostomy was done in 33 of these cases as a supplement to vagotomy, because in nearly all instances there was some degree of duodenal obstruction, either from scar, induration, or œdema. I have been very dissatisfied with the procedure. Gastro-enterostomy does nothing to prevent gastric distension, and until a large measure of tone is restored to the stomach it does little in the way of effecting drainage. Consider that the results of gastro-enterostomy alone in the treatment of duodenal ulcer, gave a fairly high percentage of cures; in these instances it tends to becloud the issue and to make it difficult to assess whether the results are due to vagotomy or gastro-enterostomy. Three cases where an exclusion resection, removing 75% of the stomach to the pylorus, were fortified by complete vagotomy and in three cases with extremely high acid values, 75% of the stomach, including the duodenal ulcer, were resected and were fortified by resection of the anterior vagus. It is in these extremely high acid values that subsequent marginal ulceration is prone to develop, and the differential section was performed in an attempt to discourage such a sequel, even after adequate resection.

The result of gastric resection for intractable duodenal ulcer, with excision of the ulcer and removal of at least 75% of the stomach, has

given such dramatic and excellent results through the years, with a mortality rate of under 3%, and a morbidity rate far below vagotomy, that I have now practically abandoned the use of vagotomy for duodenal ulcer and have gone back to resection. Gastric resection is still with me the yardstick by which all other operations for ulcer must be measured. I believe, however, that the advantages of selected vagotomy far outweigh its disadvantages and after six months practically all my cases are in excellent health. But so are my resections and they do not require this six months' period of gastro-intestinal rehabilitation. Furthermore, vagotomy is quite as irreversible a procedure as is gastric resection and in my hands has carried a higher mortality.

My opinion in connection with vagotomy for duodenal ulcer is that it should be reserved for those cases in which resection is inadvisable, technically too difficult, or as a fortification to resection in cases of excessively high acid values. All other surgical intractable duodenal ulcers should have a gastric resection of a standard consistent with modern concepts of adequacy.

TABLE V.
COMPARATIVE MORTALITY

	Operative deaths	Percentage
480 Gastric resections for ulcer (successive)	13	2.2
66 Vagotomies (successive)	3	4.5

TABLE VI.
CAUSE OF DEATH

Intestinal obstruction	1
Pneumonia	1
Subphrenic abscess and obstruction	1

SECONDARY MARGINAL ULCERATION

It is in these cases of marginal ulceration following gastric resection or gastro-enterostomy for duodenal ulcer that vagotomy weaves its most potent magic. These cases are the real reason why something like vagotomy became necessary and was so welcome, while a few of these cases were cured by more complete subsequent resections or removal of remaining antral pouches left in previous exclusion resections, the great majority remained crippled, unrelieved and usually in greater distress as a result of it, than they were with the condition which their operation had been designed to relieve.

I have now operated upon 11 of these cases with the most dramatically successful results in 10 of them; the odd case died of intestinal

obstruction following gross distension from postoperative intestinal atony. In every instance pain was abolished at once, all have become acid-free and all have remained perfectly well. While I am convinced that such uniformly gratifying results could not be maintained over a much larger series, yet if vagotomy does no more than restore a high percentage of these cases of secondary gastro-jejunal ulcerations, that alone will place it high on the list of justifiable and worthwhile surgical procedures of exceptional merit.

TABLE VII.
MARGINAL ULCERATIONS

Successful results	10
Unsuccessful results, intestinal obstruction 22nd day	1
	<hr/> 11

HIGH GASTRIC ULCER

Probably no single phase of gastric surgery carries a heavier load of responsibility than the decision as to what to do with these cases. Faced with the prospect of its potential malignancy, there are no criteria by which this can positively be determined short of pathological investigation of the resected specimen, yet the vast majority of them are not malignant and I do not know of any non-malignant gastric lesion which would justify total gastric resection. Transthoracic resection of the top half of the stomach and anastomosis to the oesophagus in the thorax may be the real answer but it is an extensive procedure outside the ambit of the average surgeon and not to be lightly undertaken.

There is no sure way in which the nature of these ulcers can be accurately determined, but through the years my observation has been that a high acid is apt to be associated with benignity, low acids or achlorhydria strongly suggest potential malignancy. Taken in conjunction with the other available clinical, hæmatological, radiological and gastroscopic evidence, the percentage of error can be reduced fairly low. In consequence of my reluctance to do a total gastrectomy for high perforating posterior gastric or gastro-oesophageal ulcers associated with a high acid, I have in 13 of these cases performed a simple bilateral vagotomy. In every instance the ulcer has healed promptly, pain has been relieved, the crater could no longer be visualized,

and achlorhydria developed. For as long as 17 months these cases have been rechecked. One case required subsequent gastroenterostomy to overcome a parietic stomach, this was not done on the other twelve cases as the pylorus was normal and the duodenum unobstructed.

This I believe to be one of vagotomy's main contributions to gastric surgery. All of these cases are cured, with preservation of their stomachs which to my mind is preferable to total gastrectomy with its attendant postoperative semi-invalidism. The argument may well arise that these ulcers may be malignant, but even if they are, the ones that are will not heal and gastroscopic and radiological evidence will soon pick these up four weeks postoperatively. If these high posterior perforating ulcers are malignant then they are no longer merely malignant ulcers of the stomach but malignant ulcers with invasion of surrounding viscera, and even six weeks earlier resection of this type of case would make no material difference in the ultimate result; they are bad enough in any event.

High gastric ulcer having criteria suggestive of benignity should be given a chance with simple, bilateral vagotomy—should be carefully rechecked four weeks later—those in whom healing has not taken place should be resected. The incidence of malignancy in the scar of a healed gastric ulcer is of negligible importance. A great many stomachs can be saved in this way without unduly compromising our position with respect to malignancy.

How permanent may we consider the effects of vagotomy to be? We have rechecked 9 of our early cases of a year or more duration by fractional gastric analysis, and 6 have no free hydrochloric after two hours' investigation. Three who had had postoperative achlorhydria have free acid values, the highest reading being thirteen. Should we regard this return of low acid values with anxiety? I think not. Acid is not the cause of ulcer, and physiologically a level of acid values within what we have come to define as normal limits surely must be an advantageous condition. It is not the normal acid values that we fear but rather hyperchlorhydria and I should feel very discouraged indeed if any of my cases were to return with high acid values; however, none have. There would appear to be ample time between vagotomy and the beginning restitution of acid to permit ulcers

to heal soundly—all those at least which are going to heal.

Month by month my vagotomy cases improve. The primary or neurogenic phase of secretion is abolished and with it the symptoms, but there is nothing to substantiate the belief that the secretory function of the hormonal phase of secretion is grossly disturbed. Once these post-vagotomy cases become stabilized they seem to be perfectly comfortable, they may have more "gas" than the gastrectomies, but there is a long period when they are in minor distress from one or other cause.

This time vagotomy is here to stay. Earlier in the century, attempts were made to divide the nerves to the ulcer. Now we are dividing vagi to the stomach which contains the ulcer, confident that the ulcer itself is probably just the local manifestation of a more general and ill-understood phenomenon. More and more we are treating patients who have peptic ulcer, less and less we are treating ulcer itself. The importance of hypoproteinæmic states on the maintenance of ulcer diathesis is becoming more clearly understood. The ramifications of vagotomy are wide and reports are filtering through of highly satisfactory results following its use in ulcerative colitis and kindred disorders. It has stimulated a tremendous interest in the physiology and chemistry of gastric secretion, it has already resulted in serious questionings as to the adequacy of our methods of testing and measuring gastric secretion in our clinical laboratories. It has brought us additional proof that all peptic ulcers do not heal with the development of anacidity. The old battle cry "No acid, no peptic ulcer" may still be true with respect to the genesis of ulcer, but is definitely not true with respect to its perpetuation. They can and do remain unhealed in the achlorhydric stomach.

It took me ten years to assess the value of gastro-enterostomy. It took another ten to properly evaluate gastric resection and it will probably require ten to clearly establish the position of vagotomy. From my own personal experience I believe that its greatest value is in the eradication of stubborn pockets of difficulty as in marginal ulceration and high perforating gastric ulcer. Its advantages in these situations, in my opinion, far outweigh its disadvantages.

CASE REPORTS

ACUTE PERICARDITIS SIMULATING ACUTE CORONARY OCCLUSION

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I would like to report a recent case of acute pericarditis simulating acute coronary occlusion because of its rarity and also because of the interest it aroused among our members. I was only able to find one reference to this condition. Drs. Barnes and Burchell of Mayo's Clinic¹ reported 14 cases in which 9 were definitely diagnosed as acute pericarditis.

These authorities state that there is a distinctive form of pericarditis of a benign non-suppurative nature. Pain in the chest is the most outstanding complaint. There are patients regarding whom the crucial question arises whether the diagnosis should be acute coronary occlusion or acute pericarditis. The problem is complicated still further by the well known fact that patients who have acute coronary occlusion may have pericarditis as an adjunct. The importance of making the correct diagnosis is obvious.

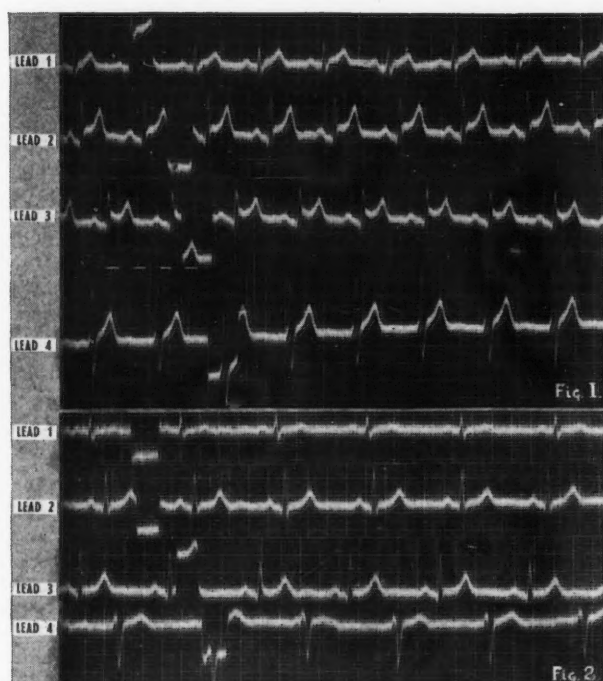
In some of these cases at no time are there any x-ray changes. This was found in the patient herewith reported. The correct diagnosis is made by means of the electrocardiograph. There will be upward displacement in one or a combination of the standard leads. The RT segment is either concave upward or forms a straight line from its origin in the R wave to the crest of the T wave. This is to be contrasted with the upward convexity of the elevated RT segment in coronary occlusion. Reciprocal deviations of RS—T segments on Lead 1 and 3, such as may occur after acute coronary occlusion, rarely occur in uncomplicated pericarditis. The T waves in acute pericarditis primarily tend to undergo one of two changes; they may become exaggerated in amplitude or sharply peaked as in our case, or they may be rounded with a dome shape. There is no Q or T pattern.

Within one to six weeks after the acute phase of pericarditis subsides, the electrocardiogram returns to normal or begins to approach normal limits. In the case here reported a normal

* Drs. Evans, Matheson and Associates, of Brandon.

electrocardiogram was obtained in eight days. There are no traces of the Q or T pattern in the standard leads and no persistence of Q or absence of R in the precordial apical leads to suggest a previous occlusion.

Mr. M.K., aged 38, construction foreman, was admitted to Brandon General Hospital, December 7, 1947. Entrance complaints were severe pain in mid chest radiating to neck and arms. Patient was cyanotic and very dyspnoic. He was given morphine and continuous oxygen in Fowler's position. Temperature was 100.2° and pulse 100. Heart sounds and pulse were very faint. No friction rub was heard. The patient had had a cold with gradually increasing pain in the mid chest for one week prior to admission. He thought that the pain became more severe after lifting a heavy pole on December 6, 1947. This brought up the question of a possible hæmopericardium.



December 8, 1947.—X-ray of chest showed no abnormalities; white blood cells 18,550; sedimentation rate 16 mm. in one hour; urinalysis negative; temperature 99.3; pulse 92. An electrocardiogram taken December 8, 1947, (Fig. 1) showed markedly elevated ST segments in Lead 1, 2, and 3. The T waves were high and peaked. The ST curve was concave upwards. These findings were consistent with a diagnosis of acute pericarditis but in view of a negative x-ray we were hard put to concede this diagnosis over coronary occlusion. The patient showed marked improvement with bed rest, sedation and hyperoxygenation. On December 16, he was up and felt perfectly well with normal temperature, a pulse of 60, blood pressure 128/84, normal x-ray findings in the chest. An electrocardiogram then taken (Fig. 2) was completely normal. He was discharged from hospital on December 19, 1947.

When the patient was seen again on January 3, 1948, he had no symptoms. The chest x-ray was again normal. On January 7, one month after his attack, he was back at work as a construction foreman.

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HÆMANGIOMA OF THE URINARY BLADDER*

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Reports of renal hæmangioma are not uncommon in the current literature but a review of the literature of the past ten years reveals a paucity of reports of angioma of the urinary bladder. Hæmangioma of the urinary bladder are of such rarity that in the textbooks of urology they are dismissed with mere mention. Macalpine, in 1930, reviewed 20 cases of hæmangioma of the urinary bladder and added two of his own. In only part of the reports was there histologic confirmation. The case presented here is deemed of sufficient interest to report.

G.G., male, aged 66, was admitted to the Urologic Service, Shaughnessy Hospital, December 12, 1946. Complaint was (1) hæmaturia, off and on for the past three months, the amounts of blood lost becoming progressively greater. On day of admission there was a large hæmorrhage with blood clots and the patient went into retention. (2) Frequency and nocturia, days every three hours, nights every one and one-half hours for the past several years, accompanied by (3) small stream and some delay in starting stream. These symptoms have become worse during the past 2 months. (4) Dysuria for the past 4 months. (5) The patient has been under medical treatment for years for a cardiac condition.

On admission he complained of severe dyspnoea on exertion. The blood pressure was 160/80; pulse 130; heart enlarged to the left. Chest emphysematous; râles at both bases. Abdomen negative, no C.V. angle tenderness, kidneys not palpable, suprapubic mass which disappeared following catheter drainage and irrigation with normal saline. Prostate slightly enlarged, grade 1, firm but glandular. Urinalysis: pH. 7.5; grossly bloody; non-protein nitrogen 40 mgm. %; Kahn negative; Hb. 50%. On continuous bladder lavage through F. 22 irrigating catheter the bleeding cleared, and then urinalysis showed pH. 7.0; white blood cells one plus; red blood cells four plus; urine culture, no growth, phenolsulphonphthalein test, 30% in 2 hours.

Excretory urogram: Upper urinary tract appears within normal limits. Moderate sized filling defect in right dome of bladder—probable neoplasm. There is a defect at base of bladder, probably due to prostatic intrusion. There is delay in excretion and at the end of one hour there is good concentration of dye present in both kidney pelves.

The patient was given two blood transfusions of 250 c.c. each. His condition had improved sufficiently that on December 19, 1946 a cystoscopy was done. This showed grade 3 intraurethral lateral intrusion with grade 2 median commissural lobe hypertrophy. There is a large, broad base, fungating tumour of the bladder, probably carcinoma, over the antero-lateral wall on the right side and obscuring the right urethral orifice. There is an extension of the growth on to the anterior aspect of the vesical neck. Marked trabeculation present.

Bimanual examination showed no fixation of the bladder floor nor induration of either the bladder floor or the vault. There was moderately advanced prostatism.

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Biopsy was not done at this time as I felt it was liable to stir up more bleeding and the area was too large to handle efficiently through the cystoscope.

By the following day the patient had again become restless and disorientated and markedly dyspnoeic. Stereoscopic films of the chest revealed adhesions at both costo-phrenic angles, extensive pneumothorax, or bullous oedema involving the upper half of the left lung field. He did not respond to medical treatment and became progressively worse, developing acute pulmonary oedema and right-sided heart failure. He died shortly after, on the same day. Autopsy findings: (1) Bilateral pneumonia, lobar on the right side. (2) Lung abscesses. (3) Fibrinous pleurisy. (4) Bilateral hydrothorax. (5) Pulmonary emphysema. (6) Myocardial fibrosis, marked, and hypertrophy. (7) Prostatism, trilobed hypertrophy. (8) Bladder tumours. Microscopic sections of the bladder tumours revealed a hæmangioma of the bladder.

In this case the tumour was wrongly suspected as being an infiltrating carcinoma of the bladder. The cystoscopy was done for diagnostic purposes. A biopsy probably would have helped in the diagnosis but was not done due to the poor condition of the patient. Local anaesthetic was used.

Hæmangioma of the bladder is reported as being a congenital lesion, slow-growing and benign but clinically malignant. One-half of the patients are under 20 years, 5 cases in children are reported. The usual presenting symptom is hæmaturia, at first intermittent and painless but later severity of the bleeding progresses and with infection comes frequency and dysuria. Diagnosis is usually made following cystoscopy, biopsy at operation or at autopsy. Nevi on other parts of the body strengthen the possibility. Small tumours are treated by endoscopic fulguration. Cauterization of a cavernous hæmangioma may result in fatal hæmorrhage. Total excision by the suprapubic route is the method of choice in all but the smallest growths.

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HYPERTHYROIDISM TREATED WITH PROPYL THIOURACIL

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In recent years, propyl thiouracil has largely replaced thiouracil in the prolonged medical treatment of hyperthyroidism. Because of the rarity of occurrence of toxic neutropenia there has been a tendency to disregard periodic checks of the white blood count. The following case is reported to emphasize again the need for careful periodic examination of the blood.

Mr. R.R.L., a man of 50 years of age, in a relatively sedentary occupation, took ill with symptoms of hyperthyroidism about September 7, 1947. During the next three months he complained of tiredness, weakness, nervousness, excessive perspiration, tremor of the hands, palpitation, shortness of breath on exertion, and loss of weight despite an excellent appetite.

On examination, December 7, 1947, he was noted to be a well-nourished, ruddy faced, middle aged man, 5' 6½" tall and 145 lb. in weight. He was obviously nervous, tense and perspiring freely. His eyes were prominent and staring with a definite lid-lag. He had a coarse and fine tremor of the outstretched fingers, while the palms of his hands were moist and warm. His pulse was rapid at 96 per minute and his blood pressure was 115/76, with a normal temperature. Curiously, the thyroid gland could not be palpated nor on fluoroscopic examination could one see a retrosternal goitre. The heart was normal in size, shape and position. The heart sounds were rapid and no murmurs or other arrhythmias were present. His knee and ankle jerks were hyperactive and when lying on his back he was able to hold up his extended leg at 45° for but 15 seconds without having to rest it from fatigue. Physical examination was otherwise negative. His orthodiagram revealed a heart normal in size, shape and position. The electrocardiogram showed left axis deviation, P-R interval - 0.20 sec. and a rate of 100 per minute. Two basal metabolic rates gave results of plus 46 and plus 49 respectively. The blood Wassermann was negative. The urinalysis was negative and his white blood count was 7,800 per c.mm., 59% polymorphonuclear leukocytes, 1% eosinophiles, 36% lymphocytes and 4% monocytes.

Despite the lack of a palpable goitre, it was felt that the available evidence justified a diagnosis of moderate hyperthyroidism, and after discussion with the patient, when the risks were duly explained to him, it was decided to treat him with a course of propyl thiouracil in a dose of 50 mgm. t.i.d., i.e., 150 mgm. daily. Treatment with this drug was commenced on December 18, 1947, and was continued in the above dosage until it was discontinued on January 29, 1948, exactly 6 weeks later. Between his first examination on December 7 and the date of commencement of propyl thiouracil therapy on December 18, his weight fell from 145 to 138 lb. and the symptoms and signs of thyroid toxicity became much more marked. The tremor of his hands became so great that he could not sign his name. During the next 6 weeks of therapy, his clinical condition improved remarkably. His sense of strength and well-being returned, he felt rested and much less nervous, his sweating decreased, his tachycardia subsided and the tremor of his hands disappeared almost completely. His basal metabolic rate which was plus 49 on December 17, fell to minus 4 on January 15. His weight rose from 138 to 140 lb. on January 12, and 145 lb. on January 31. In short it

The treatment of a disease may be entirely impersonal; the care of a patient must be completely personal.—Francis Peabody.

was felt that a very satisfactory response to therapy was being achieved.

During the 6 weeks of therapy weekly total and differential white blood counts were done to be on the watch for the development of granulocytopenia. All appeared to be going well until January 26 when it was noted that with a total white blood count of 6,300, the differential count showed polymorphonuclears 42% and lymphocytes 58%. Though the patient felt very well this finding prompted a recheck of the blood on January 29 when the total white blood count was 4,400 with polymorphonuclears 25% and lymphocytes 75%. It was apparent that granulocytopenia was developing, so in spite of the lack of any other reason for stopping therapy the drug was discontinued and the patient instructed to drink all the water he could take. The following day his white blood count: 4,800 with 13% polymorphonuclears, 87% lymphocytes; and on January 31 with a haemoglobin of 82%, the white blood count: 4,200, polymorphonuclears 2% and lymphocytes were definitely abnormal with a slate grey sieve-like cytoplasm resembling the abnormal lymphocytes of infectious mononucleosis. The patient felt perfectly well and a careful physical examination on this date revealed no abnormalities other than a few small palpable cervical glands. The thyroid gland was not palpable nor was the spleen.

Because of the extreme degree of granulocytopenia a consultation was held, following which it was decided to put him to bed and to treat him daily with 300,000 units of penicillin in beeswax and oil intramuscularly, and 15 mgm. of folic acid by mouth. The first night after commencement of penicillin therapy he complained of chilly sensations and sweats and his temperature rose to 101° F. This fever subsided during the night and following day and recurred to a lesser extent on the night of February 1. Thereafter he made an uneventful recovery during the next eleven days with a return of the leukocyte count to normal, as indicated in the accompanying table.

Date	Total white blood cells	Neutrophils	Lymphocytes and monocytes
December 17	7,800	60	40
January 5	7,900	..	..
" 12	9,400	..	..
" 19	9,200	55	45
" 26	6,300	42	58
" 29	4,400	25	75
" 30	4,800	13	87
" 31	4,200	2	98
February 2	4,400	5	95
" 3	4,800	17	83
" 4	5,650	28	72
" 5	6,900	37	63
" 6	12,400	59	41
" 9	10,300	60	40
" 11	6,000	60	40
" 20	6,200	58	42
March 1	9,200	57	43

Penicillin and folic acid were given daily for 6 days. By that time the blood picture was so favourable that it was felt safe to discontinue medication. It was particularly interesting to observe the haematological changes in the white cells. Gradually, band forms of neutrophilic leukocytes appeared and were replaced in time by more mature multilobed cells of the same series with toxic granulation. Concurrently with these changes the abnormal lymphocytes disappeared and were replaced by normal mature-looking cells of that series. A Paul Bunnell test was done because of the resemblance of the lymphocytes to those of infectious mononucleosis. This test proved to be negative. Agglutination tests for *B. abortus* and *B. tularensis* were negative.

Following cessation of administration of propyl thiouracil the patient was observed carefully for evidence of recurrence of hyperthyroidism. On February 12, basal metabolic rate was still but plus 1 with pulse of

88 and blood pressure 115/70. On March 1, he felt a little tired and had lost weight to 142 lbs. but felt otherwise well. There were no symptoms or signs of recurrence of thyroid toxicity. Whether or not a relapse will occur remains for the future to decide.

SUMMARY

A case of thyrotoxicosis treated with propyl thiouracil is reported. Severe neutropenia occurred after six weeks of treatment with the drug. Recovery from this complication took place in about six days by withdrawing the drug and administering intramuscular penicillin 300,000 units and folic acid 15 mgm. daily. At the time of writing no relapse of the hyperthyroid state had occurred. This case serves to emphasize again the need for weekly haematological control of any case of hyperthyroidism treated with this drug. Only by this means can one hope to detect neutropenia before the development of clinical symptoms and signs of this complication.

RHABDOMYOSARCOMA

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The following case is reported as a matter of clinical interest to point out the difficulty in diagnosis and rapid progress of the disease in an elderly patient.

Mrs. H.E., a white female, aged 73, had symptoms of ill health dating back to about the mid-summer of 1946, when fatigue was evident. She consulted a doctor and as no abnormal physical findings were present an x-ray of the chest was not taken. She was treated expectantly and told that rest was all that she required.

The patient was seen in my office December 7, 1946, because of pain in the left lower chest, accentuated by any movement of the spine or chest and occasionally by deep breathing. Her temperature at the time was about 100° and a tentative diagnosis of left-sided pleurisy was made, although physical examination of the chest was negative. Her haemoglobin at this time was 90% and white cell count 8,000 with a normal differential count. The urine was normal. She was put to bed and when seen on December 11, she had considerable pain in her right lower chest, but no abnormal chest findings. The pain was severe enough to require repeated doses of morphine, gr. 1/4 and her temperature varied from 98.2 to 99.5°. The remainder of her physical examination was entirely negative. On December 16, she was admitted to hospital for x-ray of chest and more thorough investigation. Stereoscopic and several lateral films of the chest were made. A summary of the x-ray report showed no apparent disease in the parenchyma of either lung. A prominent oval density was present in the left hilar region. The right dome of the diaphragm was slightly elevated, smooth and the costo-phrenic angle was clear. There was some restricted movement of the right dome noted, following the fluoroscopic examination. There was no other abnormality. The density in the left hilar region was thought to be due to enlarged tracheobronchial glands or a tumour, most probably of

lymphogenous origin. The restricted movement of the right dome of the diaphragm was thought to be due to a pleural reaction, which did not produce radiological changes.

From day to day the amount and position of the pain in the chest and back varied. The temperature varied from 99 to 100°. The white blood cells remained at a level of approximately 6,900, with a normal differential count. On January 1, 1947, some soreness developed in the right chest wall under the pectoralis muscle, but no mass could be felt. On January 5, some moisture was evident at the base of the right lung, but her temperature was normal and the soreness persisted under the right pectoralis muscle. On January 8, for the first time, there was a small lump evident over the right 4th rib which was not movable, was tender and was thought to be an inflamed gland. It was considered that the hilar glands might be inflammatory in nature. The application of heat gave some relief. The chest examination was otherwise normal, except for x-ray evidence of enlarged mediastinal glands. The patient requested that she be returned to her home and since penicillin and sulfa drug had no apparent effect on the fever she was running, or her general condition, her request was granted.

She was seen daily after returning home and by January 12 the lump over the right 4th rib had enlarged to the size of a robin's egg, was very tender and signs of lack of co-operation were noticed in the patient. She complained of exhaustion and drowsiness. Chest examination showed dullness over the left lung and bronchial breathing posteriorly. At this time her temperature was 100.2° and her pulse 130. The haemoglobin was 82% and the white blood cells 16,000 with 80% polymorphonuclears. She now began to have some pain in the right lower quadrant of her abdomen and had some loose stools. Rectal examination and abdominal examination were negative. There was no blood in the stool. Portable films of the chest were made January 13, which showed the left lung to be almost completely over-shadowed by an extensive pleural effusion, the shadow of which obscured the mediastinal tumour as seen previously. Erosion of the 8th rib was also evident for a distance of about 2 inches. A similar area was evident as well in the 4th right rib. These changes were definitely of a malignant nature. My suspicion of malignancy was thus confirmed, but this was the first evidence by x-ray examination of involvement of the lung. The patient lapsed into a coma and died two days later. Consent for a partial postmortem was obtained and this was to include section of rib only.

Pathologist's report.—The specimen is an irregularly shaped portion of creamy-gray tissue measuring 5.2 cm. in greatest diameter. On section there are thin fragments of calcified material in the central portion and there is an area of grayish-brown, soft tissue with a dull cut surface surrounding this.

Microscopic report.—Section of the tissue shows that this is a highly malignant tumour, apparently sarcomatous in nature. The tumour cells are large and often have multiple nuclei. They rest in a rather scanty stroma with areas of necrosis quite frequent. The cords and strands of tumour cells are often infiltrated between the muscle bundles which are atrophic in nature. There is also extensive erosion of the bone with a definite invasion, only a few islands of viable bone remaining. Demonstration of cross-striations were unsuccessful, but the picture seen here suggests that this is a rhabdomyosarcoma, which has either originated in an intercostal muscle or has metastasized to the rib. Diagnosis: Rhabdomyosarcoma.

It will be noted that death occurred approximately six months after the first symptom, which was fatigue. At no time was anaemia evident, the only blood change being a leucocytosis as

high as 16,000 with 80% polymorphonuclears. This change would fit in with the low grade fever the patient ran throughout her illness. X-rays of the chest December 17, 1946, 5 months after the onset of illness, showed no bone erosion, this phase occurring during the last month of life only. There were no symptoms referable to the chest prior to December 5, 1946, six weeks before death.

It is impossible to state the site of the primary lesion, as rib section only was permitted post-mortem. Multiple areas of rib erosion were evident in the final x-ray of the chest and the profound stupor in the last two days of life would probably indicate metastases to brain and elsewhere. Certainly chest x-ray, when the first symptoms were complained of, might have shown enlarged hilar glands. Here again we are reminded that it is the patient with few symptoms or signs that needs the most thorough investigation and this should always include a chest x-ray. The question arises—would bone marrow puncture at the onset of the illness in July, 1946, along with x-ray of chest showing enlarged hilar glands, have led to a correct diagnosis? If the radioactive isotopes are to offer better diagnosis or treatment of malignancy, earlier methods of diagnosis must be sought for and established in centres staffed with properly trained personnel.

Certainly, rhabdomyosarcoma varies greatly in the degree of malignancy. Cases are reported of as short a duration as two months and as long as fifty years. Treatment in the past has been confined to excision of the growth, x-ray and radiotherapy. Recurrence has been the rule except in those of low grade malignancy. Will the radio-active isotopes be the answer in treatment as well as diagnosis in the future? The reader is referred to an excellent paper by Stout,¹ for a summary of the literature to 1946.

SUMMARY

It is suggested that every physician know the value of bone marrow puncture and the part it may play in the early diagnosis of disease. It is further suggested that this procedure be a standard clinical method in every obscure case, particularly where hilar gland enlargement is found. The only hope in malignancy is early diagnosis.

REFERENCE

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A CASE OF PULMONARY AND MENINGEAL TUBERCULOSIS*

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This patient at the age of 11 months developed measles and was in contact with a relative who was later found to have tuberculosis. Following the attack of measles, the patient developed several colds with nasal discharge and cough. The T.B. patch test was found to be 3 plus, and she was admitted to Sherbrooke General Hospital in April, 1947, where she was given penicillin therapy, and within a few days showed definite improvement. X-ray taken at the time showed a right hilar shadow diagnosed as pneumonia. X-ray taken at time of discharge showed no resolution of this shadow and the parents were advised to have another chest x-ray in 3 months. Shortly after returning home the child caught a cold and ran an intermittent low-grade temperature. Her general health continued poorly, she failed to gain in weight, her appetite remained impaired, and it was noted she had a chronic cough.

In July, a repeat x-ray showed no change in the hilar shadow, and it was felt the lesion was definitely of a tuberculous nature. The patient was placed on a rigid fresh air and diet regimen. The parents attempted in every way to carry out the prescribed routine without much success as the child refused to take most of the necessary diet. Within a few weeks she refused all food including milk and when this was forced upon her, she would vomit it up.

On July 28 projectile vomiting was noted, and eventually she was admitted to the Children's Memorial Hospital in Montreal for investigation.

The positive findings were as follows: 11 lb., a weight loss of 11 lb. Temperature range 100 to 101°. Head constantly rotated to the right. Nuchal rigidity developed while in hospital. Comatose on admission, reflexes within normal range. Cerebrospinal fluid I.P. 260 to 350. Cells 152; 84 lymphocytes; 68 polymorphonuclears. Pandy 2 plus, grey web formed on standing. Chemistry: proteins 233 mgm. %, normal 10 to 35; sugar 37 mgm. %, normal 45 to 100; chlorides 405, normal 430 to 450. Sedimentation rate 29

corrected. Hgb. 10.8 gm. %. White blood cells 13,700; 8,220 polymorphonuclears, 4,932 lymphocytes, 137 monocytes, 411 stab cells; shift to the left. Mantoux 1:1,000 4 plus. Throat culture showed a light growth of streptococcus.

August 11. — Generalized T.B. lesions developed in guinea pig after stomach washings were injected. No organisms were obtained on culture of spinal fluid.

X-ray summary.—Subtotal lobar consolidation of the right middle lobe. It is the anterior segment that is consolidated. There is some atelectasis of the right middle lobe as well. There is a small lobular area of consolidation in the dorsal basilar segment of the right lower lobe.

A diagnosis of tuberculous meningitis was made and the parents were advised to take the child home. It was not expected to live more than five days. Streptomycin therapy was not advised as it was felt that it would only prolong the agony, the ultimate results would be very uncertain, and the cost to the parents would be an unnecessary future burden.

After her return home however, it was decided to try streptomycin at the local hospital. At this time, the child was in deep coma, was unable to drink or suck from a bottle, and showed signs of emaciation and dehydration. The back was arched, head rotated to the right, and the eyes continually stared upward. Reflexes were hyper-active, no reaction to pinprick, slight spasm of muscles of upper limbs. Spinal fluid showed marked increased pressure, Pandy 4 plus, pellicle formation, cell count 370. The patient was given glucose-saline intravenously and subcutaneously for 36 hours, after which she was placed on a gavage regimen q. 4 h., receiving 35 oz. of milk, meat extract, pabulum, beaten egg and lactogen daily.

Active treatment consisted of 62.5 mgm. of streptomycin intramuscularly q. 3 h. as well as 50 mgm. intrathecally q.d. 6 days a week for 6 weeks. Liver extract 5 units intramuscularly daily. Blood transfusion every 5 days while in hospital, 75 to 125 c.c. blood per transfusion.

For the first few days in hospital the patient's condition declined, and on several occasions it was felt that she would die in a few hours. However, after this first stormy period, she showed a very slow but progressive improvement. Two weeks following admission, she appeared to move the right arm and leg more than the left which was becoming spastic.

* Presented before the St. Francis Xavier Medical Association, February, 1948.

Reflexes on the right side were hyperactive while on the left they were difficult to elicit. The child was beginning to cry and struggle during the daily lumbar punctures. One month after admission the child was taking her feedings from a bottle, the left side was still spastic with knee flexed, inversion of foot with foot drop and elbow flexed. These deformities were treated by splinting, strapping, heat and massage. At this time there was still no response of the eyes to sound or movement.

Temperature range in hospital during the first 3 weeks was 99 to 102°, and during the last 3 weeks was 99 to 101°. Cerebrospinal fluid showed normal pressure, white blood cells 45, red blood cells 320, Pandy positive. It was noted that immediately following initiation of intrathecal streptomycin there was a persistently large number of red blood cells in the spinal fluid.

Six weeks from the date of admission the health authorities requested that the patient be discharged as they felt that facilities for proper isolation of the case could not be obtained. At this time gastric washings were reported negative for tuberculosis at the Provincial laboratory. This enforced move was regretted as it was felt it would be difficult to care for the child at home in the same manner as at the hospital; as the constant care and attention given to it by the nursing sisters was undoubtedly a major factor in the child's response to treatment.

The parents volunteered to carry out the treatment themselves. They were instructed in the technique of intramuscular injections and the care of the still spastic limbs. The streptomycin was prepared at the hospital and called for by the parents. A temperature chart was kept showing a gradual return to normal over a period of the next two months. The injections of streptomycin and liver extract were given day and night by the mother who, in addition, carried out all other treatments and care of the child. The problem of blood transfusion was overcome by taking the child to the hospital for one day every two weeks.

Eight weeks from the initiation of therapy, the patient reached up and took a comb out of her mother's hand, and from that point onward there was a progressive improvement to normal of hearing, sight, co-ordination and of the spasticity on the left side. Spinal punctures

done every 2 or 3 weeks showed a steady return to normal with the exception of a persistently increased cerebrospinal fluid protein; on December 19, it was 60 mgm. %.

Two guinea pigs inoculated with cerebrospinal fluid October 21 showed no T.B.C. lesions three months later. An x-ray taken in November showed the shadow in the right middle lobe to be slightly less dense than in the one taken 4 months previously.

To date, 5½ months from onset of therapy, the patient is still receiving 0.5 gm. of streptomycin intramuscularly q.d., 5 units liver extract every 2nd day, ferrous sulfate and vi-daylin daily. The child now weighs 24 lb., which is average for this age and height. She is able to walk about her crib; she has added a few words to her vocabulary; motor power and reflexes are equal; she is alert and plays well with her toys. The parents feel that she is normal in every respect.

SUMMARY

A case of pulmonary tuberculosis with probable meningeal involvement is reported, treated in hospital for 6 weeks with intramuscular and intrathecal streptomycin, and at home for 4 months with intramuscular streptomycin.

Supportive therapy consisted of gavage feedings, blood transfusions, liver injections, iron and vitamin medication, splinting, massage and strapping of spastic deformed limbs. Conscientious and co-operative nursing care carried out at first by the nursing sisters, later by the parents was a very definite contributing factor in the excellent result to date.

RÉSUMÉ

Un cas de tuberculose pulmonaire et de méningite tuberculeuse a été traité à l'hôpital pendant six semaines à la streptomycine intra-musculaire et intra-rachidienne. Les soins thérapeutiques ont consisté en gavages, transfusions, injections de foie de veau, et de fer, et de vitamines. Atteles de support, massages et bandages des membres déformés par l'atonie musculaire. Les soins consciencieux des infirmières ont été donnés d'abord par les religieuses et leur coopération suivie de celle des parents, ont été des facteurs contribuant à donner l'excellent résultat jusqu'à date.



A CASE OF TUBERCULOUS MENINGITIS TREATED WITH STREPTOMYCIN AND PROMIN

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D.W., aged seven, was admitted to the Kingston General Hospital on December 7, 1947, after an illness of eight days' duration. He complained of headache, particularly in the frontal region and loss of appetite. In the preceding twenty-four hours, he had had vague abdominal pain, was nauseated and had vomited. Six weeks previously he had had a supracondylar fracture of the left humerus which had been reduced. A sister aged two and one-half, died of tuberculous meningitis at this hospital in June, 1947, and his mother died of pulmonary tuberculosis in October, 1947. Another sister aged three and one-half was recently confined to a Toronto Hospital with early pulmonary tuberculosis.

Physical examination revealed a thin, pale looking boy who was very irritable and resentful of examination. Lips were dry, cracked; the breath foul and the teeth carious. The tongue was dry and coated. Tonsils were enlarged but not infected. A definite degree of neck rigidity was present and the child resented having its head moved in any direction. No glands could be palpated. Chest and abdomen were negative. Kernig's sign was positive. Temperature was 102°. Urinalysis negative.

A lumbar puncture was performed. Fluid was clear and opalescent and under increased pressure. There were 350 white cells per c.mm., only 7% of which were polymorphonuclears, the rest being mononuclears. Red

blood cells were 25 per c.mm. White blood cells 10,100. Mantoux test was strongly positive.

On December 8, a diagnosis of tuberculous meningitis was made and streptomycin therapy was begun. The initial total daily dosage of streptomycin was two grams, given 1½ grams daily in four divided doses intramuscularly, and ½ gram daily intrathecally. On December 16, the intramuscular dosage was reduced to one gram daily and the intrathecal dosage to ½ gram every other day. Intrathecal therapy was discontinued on December 20.

On December 16, promin therapy was begun intravenously, and the patient has received 2½ grams daily since that time.

During the first ten days, the condition seemed to get worse and he showed increasing signs of meningeal irritation. Opisthotonus developed and became marked. He had internal strabismus particularly in the left eye, and remained irritable, vomiting occasionally. On December 18, two days after the introduction of promin therapy, he began to improve and the meningeal symptoms gradually subsided. His mental picture changed and he became interested in his surroundings and was more cheerful. From that time until the present, he has received streptomycin, one gram daily in four divided doses intramuscularly, and promin, two and a half grams once daily intravenously. His temperature range for the first fifteen days was 99 to 102°, and remained elevated until about February 1, 1948, when the temperature range was 98.2 to 100°. At present (April 20) the temperature is between 98 and 100° and he appears perfectly well. No symptoms of streptomycin intolerance have appeared and no blood changes have been noted.

SUMMARY OF CEREBROSPINAL FLUID FINDINGS

Date	White blood cells	Red blood cells	Polymorphonuclears	Protein mgm. %	Chloride mgm. NaCl %	Colloidal gold	Sugar mgm. %
December 7	350	25	7%	135	600	0001122100	0.051
December 8	295	55	3%	144	640	0001221100	
December 9	275	1,360	10%				
December 10	215	55	7%				
December 11	185	195	3%	177		0001121100	
December 13	175	35	6%				
December 16	650	24					
January 2	210		31%	123	680	0001222100	
January 16	59	1		150	685	0011232100	0.018
January 30	60	1,212		143	680		
March 26	36	9		69		1233321000	
April 20	17			64	720	0011111000	0.051
May 26	11			45	715	0011111000	0.048

Three x-ray films were taken between December 9 and April 20. The first film showed some stranding leading from the left hilus to the upper left paravertebral region and opposite the end of the first rib in front on this side there was a small round opaque area which, in view of the history of the case probably represented a tuberculous lesion. The second film made in January showed the same shadows but they were not nearly as prominent as in the first film. The last film, in April, shows markings that are quite within normal limits, the small round opaque area seen in the first film having completely disappeared.

SUMMARY

A case of tuberculous meningitis is reported, treated with streptomycin and promin. After five months of treatment the patient appears well and free of symptoms. No untoward effects were noted from the use of either streptomycin or promin. It is planned to discontinue streptomycin therapy shortly, and continue either promin or promizole therapy for another 5 to 6 months.

PROGRESS NOTE (MAY 30)

Seven months after appearance of symptoms, this patient appears perfectly well. Streptomycin therapy was discontinued one month ago. Promin is still given once daily. The present temperature range is 98 to 99.2°. Blood picture, May 26, 1948: Hæmoglobin 11.75 gm.: red blood cells 3,975,000; white blood cells 10,000; differential count, polymorphonuclears 57%; lymphocytes 34%; monocytes 3%; eosinophiles 6%. Red blood cells appear normal.

Spinal fluid: Cell count 11; protein 45 mgm. %; chlorides 715 mgm. %; sugar 0.048 mgm. %; Colloidal gold 00111111000.

The author wishes to extend thanks to the Parke Davis Co. for the promin supplied for use in this case.

SPECIAL ARTICLE

ANÆSTHESIA AND THE PURSUIT OF LEARNING*

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"It is the lot of most teachers to be outgrown by their best pupils."—Glover, *Virgil*.

Towards the end of the last century, the Professor of Latin in Queen's University was Terrot Reaveley Glover. Later, while Fellow and Lecturer of St. John's College, Cambridge, he wrote his *Virgil*. It is from this that the epigraph of

my evening's essay has been chosen. The implication is twofold as it applies to him who would learn and, as well, to the one who instructs. In any avenue of thought the preceptor ought so to influence the environment that the student will excel him. The scholar should so emulate his teacher as to outdo in knowledge and action. But the way is not easy, for as Æschylus says, "Zeus made for man the road to Thought, and established 'Learn by suffering' to be an abiding Law." (Agamemnon, 176).

In D. C. Somervell's Abridgment of Toynbee's *A Study of History* (1947), at end of the book, under the title of *Argument* (division XVI, called, *Failure of Self-determination*), from the subdivision, *The Mechanicalness of Mimesis*, may be quoted the warning that "the leaders may become infected with the mechanicalness of their followers, and the result will be an arrested civilization; or they may impatiently exchange the Pied Piper's pipe of persuasion for the whip of compulsion. In that case the creative minority will become a 'dominant' minority and the 'disciples' will become a reluctant and alienated 'proletariat'. When this happens the society enters on the road to disintegration. The society loses capacity for self-determination." There may develop a state of affairs like "new wine in old bottles", and there may obtain many forms of Nemesis. Let us all take heed. Let the student-specialist in anæsthesia concern himself and pay careful attention to the words of wisdom from men like Sir James Paget, Sir William Osler and Sir Charles Sherrington. Let him read the works of these men so to glean admonitory doctrines therefrom.

Time was when it used to be difficult to learn anæsthesia, but opportunities have been increasing ever since Waters incepted organized courses in anæsthesia at the University of Wisconsin in the middle twenties. Nowadays, in the American and British worlds at least, medical schools are paying more and more attention to the teaching of anæsthesia, and now and again the good news comes of the setting up of yet another department of anæsthesia at some hospital or university, or both; in either instance additional timeliness is offered those who desire to learn anæsthesia. In medical school it is remarkable how much satisfaction has come to the undergraduate on account of the increase in the number of lectures, in the number of laboratory periods and in the number of hours spent taking an active part in clinical anæsthesia. In truth, largely, it is he who has caused this improvement to come about by persistently requesting better chances to learn anæsthesia. Again, in a hospital which has an established department of anæsthesia, the intern who is doing rotation service will become more familiar with the subject than he would otherwise and will consequently be better well equipped for general practice.

* Delivered at the Meeting of the Section of Anæsthesia of the Ontario Medical Association in Kingston, November 20, 1947.

Department of Anæsthesia, McGill University, Montreal 2.

In an excellent recent article* Charles F. McCuskey points out that "despite obstacles, inertia and discouragement anæsthesiology is a growing specialty. It has grown slowly to the present, but everything indicates that its growth will be rapid in the future. In many centres it is an active specialty, the value of which has been firmly established through the efforts of a few teachers and excellent clinicians". Further along he says: "It seems to me that each anæsthesiologist must be a teacher. He must teach surgeons, residents, interns, medical students, nurses and the laity what he represents and what he can do to lessen the burden of illness for the patient. The anæsthesiologist must also be a clinical physiologist". With such a growing tendency towards a better appreciation of the necessity of good anæsthesia, it is easy to see that of greatest importance is the postgraduate course for those who desire to learn anæsthesia in as complete a manner as possible.

Now, seeing that there is considerable similarity between the already-established courses, it may suffice briefly to describe the three-year Diploma Course presently functioning in the department of anæsthesia at McGill University. In this course the aspirant must have had one year of internship in an approved hospital, preferably in the department of internal medicine. Throughout the three years, the candidate resides in one of six hospitals moving from one to another every six months. In this rotative manner the individual gains a diversity of experience under the tutelage of many qualified anæsthetists. The benefits of this many-sided method of acquiring skill are readily evident, for he who learns from many masters is bound to be more versatile, more Jeffersonian and more percipient than he who ranges under one rubric. In keeping with the motto of this article, the anæsthetist of tomorrow ought therefore to be all the more accomplished. Such a course enables the participant to prepare for the Diploma in Anæsthesiology of the American Board of Anæsthesiology, for the Diploma in Anæsthesia of the Royal Colleges of Physicians and Surgeons of England, and/or, for Certification in Anæsthesia by the Royal College of Physicians and Surgeons of Canada. Furthermore, one or more of those who have taken this course and who show an aptitude are chosen occasionally to do research work in anæsthesia. Has not John Dewey just recently written (1946) in his *Problems of Men*, that according to empirical pragmatic philosophy, science provides the only means we have for learning about man and the world in which he lives? And, has not Alfred North Whitehead lately written (1947) in his *Essays in Science and Philosophy*, that "John Dewey is the typical effective American thinker; and he is the chief intellectual force providing that environment

with coherent purpose. Also wherever the influence of Dewey is explicitly felt, his personality is remembered with gratitude and affection."?

All through the course there are weekly seminars and symposia, carefully planned and supervised. Occasionally each year guest speakers of distinction are brought on from other centres. Each member is obliged to write a thesis on an allocated subject which, after presentation, is subsequently edited and mimeographed for distribution. The following is the list of the subjects for the current academic year: (1) The Nature of Sleep, Consciousness and Unconsciousness; (2) The Nature of Neuromuscular Transmission and the Action of Curare; (3) The Physiological Consequences of Hypoxia and Hyperoxia; (4) Problems of the Anæsthetist—Hazards in the Use of Anæsthetics and their Adjuvants; (5) The Anæsthetist's Interest in Salt and Water Metabolism; (6) Parenteral Feeding—the Anæsthetist's Interest in Intravenous Therapy; (7) Current Ideas on Protein Storage and Metabolism; (8) Liver Function; (9) Liver Damage; (10) Nutritional Status and Operative Risk; (11) Kidney Function; (12) The Anatomy and Physiology of the "Respiratory Centre"; (13) The Nature of Ventricular Fibrillation—its Prevention and Treatment; (14) The Effectiveness of Resuscitators and Other Means of Artificial Respiration; (15) Acidosis; (16) The Technology of Anæsthesiology; (17) The Influence of Anæsthetic Agents upon the Heart; (18) The Functions of the Carotid Body. It is being considered that in the future there will be assignments of essays each year. The writing of essays is regarded very highly as it causes the candidates to use the library intently, gives them practice in writing and supplies thoroughly prepared and well edited reviews for circulation. It is proposed that some of these compositions will be published. As early in the course as can be arranged with the chairmen of the respective departments, ancillary courses are given on topics of the basic sciences as these pertain to anæsthesia. Aristotle has said that "physicians of the better class devote much attention to the study of the human body." (*The Nicomachean Ethics*, I. XIII. 7-8).

In anatomy fifteen afternoons are spent in the laboratory under the direction of the professor or his associate and the course comprises: (1) The anatomy of the respiratory tract with special reference to tracheotomy, intubation, etc. (2) The vertebral column, vertebral canal, spinal cord and the meninges. (3) The general course and distribution of the peripheral nerves. (4) The cranial nerves. Special attention is paid to the sites where each nerve is available for injection; the anatomy and surface landmarks of such sites, advantages and disadvantages of alternate sites, hazards of each and safeguards to be taken, anæsthetic area resulting from each block, common variations and possible sources of partial failure. As an example, the brachial plexus may be taken. First the composition and anatomy of the plexus is dealt with, its branches, their courses and distribution. From this four different routes for injecting the plexus are arrived at—the paravertebral, supraclavicular, infra-clavicular and axillary. The anatomy and surface markings of each route are described. The students carry out the injections on the cadaver and have to verify that the point of their needle actually reached the desired spot. The advantages and disadvantages and hazards of each route are discussed. Similar injection sites in the distal part of the upper limb and in all parts of the body are dealt with in the same way. Extra-dural blocks, including sacral (so-called "caudal") block, and dental blocks receive special attention.

Instructional opportunities for anæsthetists in the department of biochemistry of McGill University had inception during the war when those medical officers of the fighting forces who had been sent for training in anæsthesia were detailed to that department. Here the following schedule is at present in operation. (1) Blood

* Anæsthesiology as a Specialty, *J. Am. M. Ass.*, Oct. 4, 1947.

—present knowledge of blood preservation; trends in the operation of hospital blood banks and in the distribution of blood to hospitals; new developments in apparatus for collecting, storing and administering blood. (2) Blood Substitutes and Blood Groups—current views on so-called blood substitutes; use of preserved blood serum, plasma, albumin and globin; survey of blood groups and types. Laboratory demonstrations on technique of blood-typing. (3) The Rh Factor and Its Clinical Significance—present knowledge and trends. (4) Body Water and Electrolytes—review of salt and water metabolism. (5) Nutrition—basic considerations in energetics and nutrition. (6) Liver Function and Liver Damage—critique of various tests of liver function; factors which cause liver damage; renohepatic relationship. (7) Kidney Function—current concepts of function and factors that lead to impairment. (8) Protein Metabolism in Disease—disturbance in nitrogen metabolism after trauma; treatment—restoration of nitrogen balance.

In the department of pharmacology six one hour periods are devoted to discourses on the actions of the various drugs used in anæsthesia. Particular attention is paid to the opiates, the barbiturates, drugs used for regional anæsthesia, curare preparations, and the analeptic drugs. In each instance special consideration is given to relative toxicity, efficacy and applicability.

The course in physiology consists of lectures and demonstrations followed by laboratory periods in which the salient points of the lectures are studied experimentally. Six afternoons of three hours each are given over to this work. The physiological background of problems confronting the anæsthetist are discussed. The main attention is directed to three major systems most directly implicated in anæsthesia: (1) The nervous system; (2) the respiratory system, and (3) the cardiovascular system. Under the first are treated the problems of (a) Pain; (b) Sleep and Unconsciousness; (c) Muscular Tone and Relaxation, and (d) the Autonomic System. For the second are subsumed (a) Mechanical Factors; (b) Nervous Control, and (c) Chemical Control. The third is divided under the headings of (a) The Heart, and (b) The Blood Pressure.

In keeping with the increasing tendency to put mental illness on a similar footing to physical illness, it has recently been instituted that the postgraduate student of anæsthesia will have a short course in psychiatry under the direction of the professor of this subject. It stands to reason that such instruction must have a definite value in helping the anæsthetist better to make suggestion, better to gain confidence. Has not someone said that suggestion is an attenuated form of hypnosis?

Having taken such a course as is here depicted, the student of anæsthesia will find himself imbued with much knowledge which, in Rabelaisian language, "goeth far beyond the reach of any price or value; it transcends all weight, all number, all measure; it is endless and everlasting."

Bearing in mind that not all hospitals enjoy the facilities of association with a medical school, there ought to be some standard for their guidance in order that they may adequately participate in providing opportunities for those who desire to pursue learning in any speciality. With regard to anæsthesia, I had occasion, in 1938 (*Hospitals*, January, 1939), to say, at the Twenty-First Annual Hospital Standardization Conference, American College of Surgeons, that the staff of anæsthetists should consist of a director, associate anæsthetists in number suitable to the surgical requirements, and as many intern anæsthetists as the extent of the work necessitates; that the anæsthetist should

collaborate with the physician and the surgeon in the selection of drugs and methods of their administration, endeavouring to suit both to the patient's general condition as well as the individual requirements of the case, always avoiding routine measures; that the members of the department of anæsthesia should take an active part in the immediate postoperative care of the patient; and that records should be kept, in each case, of all relevant data prior to, during, and after operation. Colloquiums and seminars should be conducted frequently and attended by all of the anæsthetists and, too, any of the general medical staff who are interested. From such deliberations valuable information may be obtained and used for publication. This in itself bespeaks research—augurs the investigation of problems in an institution not necessarily in close connection with a university. But, how may the hospital, which has no affiliation with a university, provide special training in the basic sciences? While it is possible for the attending staff to make themselves proficient sufficiently to guide learning in this direction, it is easy to see the difficulties of uniformity. At present there is a tentative movement on foot in some parts of the United States to have itinerant instructors give courses to various groups of residents in anæsthesiology; but this scheme, too, may present perplexity. The most satisfactory solution to the problem seems to be that the hospital should so bring its department of anæsthesia up to good criterion as to be justified in seeking association with a nearby university not only to obtain instruction in the basic sciences for the residents, but also to have these rotate every six months with the residents in anæsthesia of the hospitals more intimately attached to that university. It would appear that this is a consummation devoutly to be wish'd.

Let us rejoice as opportunity for learning anæsthesia grows. Æschylus, pliant still when nearly seventy years of age, did even say, "It is ever a joy for the old to learn." Let us address ourselves to Apollo, God of learning and poetry, and of the teacher, in Shakspearean simile say, I see his voice, I can hear his face.

Pyramus. I see a voice: now will I to the chink,
To spy an I can hear my Thisby's face.
(*Midsummer Night's Dream*, act v. sc. 1.)

The position of the physician who deals with the nervous and feeble, the painworn, the hysterical, is one of the utmost gravity. It demands the kindest charity. It exacts the most temperate judgments. It requires active, good temper. Patience, firmness, and discretion are among its necessities. Above all, the man who is to deal with such cases must carry with him that earnestness which wins confidence.—S. Weir Mitchell.

CLINICAL and LABORATORY NOTES

TRISODIUM PHOSPHATE IN CULTURING FOR TUBERCLE BACILLI*

A. R. Armstrong, M.D., B.Sc.

Hamilton, Ont.

Corper and Stoner¹ in 1946 described the use of trisodium phosphate for the preliminary treatment of sputum prior to culturing for tubercle bacilli. Their procedures in our hands has proved much superior to all previous techniques for eliminating contaminants and for concentrating the tubercle bacilli. However, their communication appears, so far, to have escaped the attention of medical bacteriologists in this country, and the writer has noted only one reference to its use in the American literature² other than a review and extension of the original paper by Corper and Bain.³ This note is to report on its employment in over 6,000 sputum cultures for tubercle bacilli performed at the Mountain Sanatorium.

The principle involved is that, in the proportions recommended, trisodium phosphate is not lethal to tubercle bacilli even after long exposure (8 days), yet, its alkalinity is of such a degree that sputum can be completely digested at incubator temperature overnight, and, at the same time, contaminating organisms largely destroyed.

Sputum or lavage material is treated with an equal volume of 10% Na_3PO_4 (23% $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$) after which it is incubated at 37° C. over-night or over week-end (to suit convenience). Then most of the supernatant fluid is decanted, the sediment transferred to a 50 ml. centrifuge tube and spun at about 2,500 revolutions for 20 minutes. The resulting supernatant fluid is decanted and the sediment neutralized with 5% hydrochloric using litmus paper as an external indicator. About 0.1 c.c. is then planted on each of two slopes of a modified Petragnani potato-egg medium.

The overall results have been as follows: Contaminations with other organisms have been reduced; the incidence of cases in which a positive direct smear of concentrate has been followed by a negative culture has been reduced (nearly to zero); cultures are positive on the average in a shorter time; the concentrates are of better quality with which to work, and, finally, technicians can get away on time even when specimens come in late in the day. The following self-explanatory table concerning the positive sputa detected in the first three months of the current year is of interest.

Weeks after planting that culture became positive	Number of sputa positive	Percent positive
1	0	
2	31	6
3	165	30
4	182	33
5	112	20
6	50	9
7	12	2
8	3	
9	1	
10	0	
11	0	
12	0	

It shows that many cultures become positive as early as two weeks although the vast majority take from three to five weeks. These results are better than had been obtained with the sodium hydroxide technique.

Several communications in recent years have stressed the fact that tubercle bacilli in gastric juices of certain patients may lose viability on standing. Experiments in this laboratory have not shown appreciable loss in viability unless specimens are at a temperature approximating 37° C.—a possibility in summer time. The addition of trisodium phosphate to the lavage material prevents the destructive action of these gastric juices. Therefore, it should be added as soon as possible after the specimen has been taken. Experiments are presently in progress to study the practicability of having the sputum and lavage material collected directly into trisodium phosphate at the bedside. If this is feasible, contaminated cultures should be reduced even further in number.

It is recommended that laboratories receiving specimens to be cultured for tubercle bacilli, particularly public health laboratories, give consideration to Corper and Stoner's procedure.

The author wishes to acknowledge technical assistance of Miss S. Estwick, Mr. P. Smith and Mr. G. Blair and also to thank Dr. H. T. Ewart, Medical Superintendent, for permission to publish this note.

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The rumen of a cow's complex stomach is a vitamin factory, capable of turning out not only enough B complex for her own needs, but a surplus that is excreted with her digestive wastes. Although this fact was discovered at Pennsylvania State College some years ago, scientists and feed manufacturers are now concerned with the problem of determining how to include the surplus B vitamin eliminated in cow manure in feeds for other forms of livestock without offending customers or an oversensitive public.

* From the Laboratories of the Mountain Sanatorium, Hamilton, Ont.

THE CANADIAN MEDICAL ASSOCIATION**Editorial Offices—3640 University Street, Montreal***(Information regarding contributions and advertising will be found on the second page following the reading material.)***EDITORIAL****ECONOMIC FACTORS IN MEDICINE**

THE question "Where are we going?" is no more easily answered for medicine than for any other part of human affairs. But there are some aspects of developments in medicine which are easy enough to examine, whatever our conclusions may be. Some of these are very clearly dealt with by Dr. Frangcon Roberts in a paper on Medicine in a Planned Economy.* His remarks, while concerned with Great Britain, are applicable wherever government controlled medical services may be contemplated. The expansion of medical knowledge and its application to the control of disease needs no elaboration. What is not quite so generally understood is the accompanying rise in cost, both in money and in man-power, and, further, the acceleration of this increase. The rise occurs in every detail of hospital practice; in the cost per head of both indoor and outdoor patients; in the numbers of staff; in the number of pathological examinations; in the number of blood counts; the number of x-rays; and so on. "Whatever medical activity we plot against time we find the same result; acceleration towards infinity".

Dr. Roberts shows that this is not merely a catching up with requirements, with prospects of eventual stabilization. In past times provision has seemed adequate for a given period, only to prove hopelessly inadequate in a short time.

Again, it may be suggested that improvements in the standard of living should produce a diminution in disease. But even if the blessed event of high standards of living should come to pass we are not to expect any such decrease. The major diseases which crowd hospitals are not yet proved to be related to social conditions. Indeed social developments can actually increase the demands on the hospitals. Such an apparently small and unrelated matter as the accepted requirement of an x-ray in even trivial injuries as a protection in possible litigation,

brings about a vast amount of x-ray work which is medically unnecessary. As another example, hospitals feel that they must maintain certain attractive features which people have come to regard as essential.

Will disease diminish with advance in science? Dr. Roberts points out that our successes so far have been with acute rather than chronic disease, and in the case of the latter, cure is being outstripped by treatment. Our knowledge about the natural history of disease is no measure of the speed at which we are finding the causes of disease.

As to the relationship of medicine to economics Dr. Roberts feels that if the laws of economics are applied to medicine (and there is nothing to show that medicine can be independent of them) there is no possibility of any planned economy being able to support a health service in which expansion is taking place with the acceleration which medicine now exhibits. His conclusions may be open to discussion but it is to be hoped that any attempts at government health legislation will take into consideration some of the unquestionable factors of cost which must be faced if a health service worthy of the name is to be introduced.

EDITORIAL COMMENT**Papers for the Annual Meeting**

The arrangement of the scientific program for the annual meeting has its complexities. With the growth of our Association the matter of selection of the material becomes more and more difficult, but it is generally agreed that the Central Program Committee carries out its work with a high standard of excellence. Criticism has been made however on the ground that some members for various reasons have not enough opportunity offered them for submitting papers for consideration by the Program Committee.

Members are therefore informed that those desiring to submit papers for possible inclusion in the next annual meeting program are invited to do so through the General Secretary, 135 St. Clair Avenue West, Toronto 5. The meeting in 1949 will be held in Saskatoon during the week of June 13.

* *Brit. M. J.*, p. 485, March 13, 1948.

Work is not man's punishment; it is his reward and his strength, his glory and his pleasure.—George Sand.

MEN and BOOKS

HISTORY OF MEDICINE IN THE EASTERN TOWNSHIPS*

J. R. D. Bayne, M.D.

Montreal, Que.

It seems most appropriate that your Committee should have included in the program for this meeting several historical sketches, as a welcome to those among you who are strangers to this district, and also as a reminder of the great obstacles and challenges so recently overcome by our medical predecessors. And the time is not ill spent, if we believe a pioneer historian when he said that persons who were not interested in the achievements of their forebears, would never achieve anything to be remembered by their descendants.

The Eastern Townships includes an area extending from the Richelieu River on the west to the valley of the Chaudière on the east, and from the American boundary, north to the French settlements on the St. Lawrence. The name was first used about 1806, probably to distinguish the district from other townships lying north of Lake Ontario which had existed since 1784. In 1823 the area lying between Lake Memphremagog and the Beauce Valley was named the Inferior District of St. Francis, and soon afterwards the word "inferior" was omitted as inappropriate.

One hundred and fifty years ago when the first pioneers began their heroic struggle to settle here, the rolling country was densely wooded, and virtually unexplored except by bands of Indians. Many of you are acquainted with the story of the terrible hardships endured by Major Rogers and his followers when they traversed the district in the middle of the eighteenth century. The scene had not changed when the groups of families began to push into the hinterland at the end of that century. The United Empire Loyalists had been dispossessed through their declared allegiance to Great Britain during and following the American Revolution, and determined to found new homesteads in Canada. A group of 30 to 40 families would become associates owning the land of one township, each family being given 200 acres. Leadership was assumed by one or two men possessing more of wealth or prestige, but few were the wealthy settlers in those days, and it is difficult to imagine or believe the hardships endured by these families with young children who pushed into the virgin forest sometimes 50 miles from the last bush road or navigable river.

* Presented before the Canadian Medical Association (Quebec Division), at Sherbrooke, Que., on April 24, 1948.

Physicians were rare, since the poverty-stricken and sparsely settled districts could not support them. Nearly all the early practitioners had other duties beside their professional ones, partly because educated men were not abundant, but also, no doubt, to fatten out a meagre income. Some taught school, many acted as court commissioners, others had land of their own to clear and harrow.

One of these early practitioners was Dr. Stephen Sewell Foster who came from Vermont in 1822 with a group of settlers and established himself at Frost Village in Shefford on his own farm. He was licensed to practice by the Vermont Medical Society, but attended lectures at Quebec and later at McGill as well. In the early days he was the only medical man within a radius of 40 miles, from Yamaska Mountain to Missisquoi Bay and east to Stanstead, Sherbrooke and Melbourne, and would travel by log canoe down Lake Memphremagog, or by blazed trails across wide stretches of country on foot or snowshoe. To his dying day it is said he never refused to answer a call.

He was appointed surgeon to Col. Jones' Battalion of militia about 1825, and was also joint coroner of the district for many years. Dr. Foster was Justice of the Peace and Commissioner for the trial of small causes when there was no other court in the Eastern Townships. In 1841 he was elected and then re-elected to the Provincial Parliament for Shefford. On the formation of the College of Physicians and Surgeons of the Province in 1841, he was elected a governor. In an obituary notice in the *Waterloo Advertiser* of 1869, the Hon. L. S. Huntingdon said:

"His gentleness in the sick room—his tenderness for the afflicted . . . endeared him to the people . . . the inclemency of the weather, the fearful roads of the new settlements, night after night of unremitting toil, had no terrors for the 'Old Doctor', as he was called . . ."

From Frost Village a hardy traveller could follow an abominable road to Luke Knowlton's farm on the shores of Lake Memphremagog, and cross over on a large flat boat propelled by sweeps to Copp's Ferry, later known as Georgeville. It was a busy village in 1820, on the postal route from Montreal to Beebe and New England. The road ran through Ayers Flat to Stanstead Plain, a thriving border town and depot for travellers to and from the United States that was noted for its fine houses and prosperous farms.

Here in 1832 came Dr. Moses French Colby, born in New Hampshire in 1895, who had studied medicine at Yale in 1817, Dartmouth in 1820 (from which he graduated in 1821) and, after several years of practice, had returned to study at the School of Practical Anatomy at Harvard in 1828. On coming to Lower Canada he was required to pass a rigid examination before the Medical Faculty at Quebec and obtained a

license to practice. He soon showed his ability, as a skilful practitioner, as a correspondent with Dr. Gould, the President of the Massachusetts Medical Society, and with the *Boston Medical and Surgical Journal*, and as a public-minded citizen. He was surgeon for the local militia during the Rebellion of 1836-37. In 1837 he was elected member for Stanstead in the legislature, and, after the union of Upper and Lower Canada he stood again for election in 1840. His opponent was Marcus Child, the local druggist, a Liberal in the widest sense of the word, who had been forced to leave the country in 1837. It is an interesting reflection on the times, and on the people (especially considering their constancy in political affiliation today) that Child was elected as their candidate. The supporters of Dr. Colby comforted themselves by saying that Child had a *nominal* majority but they had a majority of *legal* votes.



A young Mr. R. N. Webber came to Stanstead in the same year as Dr. Colby and became the Collector of Customs. Deciding to study medicine he apprenticed himself to Dr. Colby, as was the practice in the days before medical schools became established in Canada. He later took lectures at Harvard, and witnessed the second occasion of the use of ether in that institution. He graduated in 1847 from Bowdoin College and settled at Richmond, below Sherbrooke on the St. Francis River. This town was another of the centres for immigrants to the Eastern Townships. Long known as Shipton, it was the terminus for the Craig Road that had been put through by the militia from Quebec in 1811 under the direction of Governor Craig, and as such was witness to many distressing scenes. Would-be settlers from Europe arrived at Quebec in the early spring poorly clad, poorly fed, miserably equipped and with no knowledge of the country or how to clear it. Many of them were ridden with lice and other vermin, and with

them came the dreaded cholera to wipe them out in scores.

Besides the Craig Road, described by the Government Surveyor Bouchette in 1832 as "almost impassable owing to swamps and windfalls", two roads ran down the river to the St. Lawrence where goods were unloaded from ocean vessels.

Dr. Webber's practice covered an area about 20 miles radius from Richmond yet it was said that "there was hardly a farm house in that large territory in which he had not at some time ministered to the sick". He was dignified, gruff, but kindly. His interest in public affairs prompted him to play a prominent rôle in founding the St. Francis College, which was associated with McGill, and he taught mathematics and chemistry. He was also a classical scholar, and at the age of 70 would spend sleepless hours reading the New Testament in the original Greek.

We have made a tour of the townships, now let us return to the Chef-lieu, where the Magog River tumbles down a narrow precipitous gulley into the St. Francis, called Big Forks, and later Sherbrooke. The village had grown by 1832 to become a centre of 50 houses at the head of navigation on the St. Francis River and the seat of jurisdiction for the District of St. Francis. Some years later its importance was increased by the arrival of the Grand Trunk Railway from Montreal via Richmond, and a paddle-boat to ply up the river to Lennoxville carrying excursionists.

In 1843 there arrived a small, stocky Irishman called Edward Dagge Worthington, with sharp blue eyes, fiery hair and beard, and a temper to match. He had been apprenticed to Dr. Douglas, the well-known surgeon at Quebec for seven years, and then had studied at Edinburgh under the famous doctors Argyll-Robertson, Jr. and David Skae, and the infamous Dr. Robert Knox. He was licenced by the Provincial Medical Board on his return and soon settled at Sherbrooke or, as he would facetiously refer to it, "Little Peddlington on St. Francis".

It was not long before he made his mark as a surgeon, and by his pioneer work in anaesthesia, for he was one of the first in Canada to use ether in an operation, and probably the first to use chloroform. The records show that Dr. A. F. Holmes used chloroform in a delivery on January 25, 1848, while on the same day Dr. Worthington was removing a tumour from a child's hand by its aid. The drug had been made for him by Mr. S. J. Lyman, the druggist in Montreal.

To the townspeople Dr. Worthington was something in addition to a skilful and daring investigator. His manner was gruff and his temper violent, so that when one day an unthinking farmer was found sitting in his office

covered with small-pox lesions, the doctor drove him out of the town with a horse whip. Yet he was gentle and considerate with the afflicted and devoted to his profession. On one occasion a gold watch and chain was presented to him for his work in a severe smallpox epidemic, and later a silver tea service bearing the family crest in appreciation of his kindness and devotion to the poor. The following was said of him, following his death in 1895, by the *Medical Age* of Detroit:

"... his whole life was intimately interwoven with the medical history of Canada, and was an integral part of the history of the Province of Quebec. It is the lot of few men to be so noble, so distinguished, so loved, and so missed."

While I have of necessity left unmentioned many others who gave distinctive service, these four may serve as facets to direct your attention to their accomplishments, and to add interest to the various localities you may visit while in this district.

One cannot but be amazed at the achievements of these men who, working under such arduous conditions, and lacking the facilities that we now regard as essentials, were successful in so many of their endeavours. Perhaps their success depended on the extreme broadness of their view, for they saw medicine as a composite whole, and treated the patient as a man, whom they knew intimately because they lived his life.

MEDICAL ECONOMICS

HEALTH SERVICES IN NEW ZEALAND*

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Among the free nations of the world, New Zealand has done the most "advanced" experimenting with state intervention to furnish health services for all of the people. It is now ten years since provision for health benefits was written into the Social Security Act of 1938. Actually, however, no comprehensive study of the scheme has heretofore been published in North America.

The essential feature of the New Zealand system of health benefits is that the state pays for basic medical, pharmaceutical, hospital, and

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some other services. Health benefits are universally available to the whole population without means test of any kind. Funds are raised through taxation. In compensating general practitioners, both capitation and fee-for-service methods are used, but the overwhelming majority uses the latter. Pressure from the profession led to three major concessions: the fee-for-service plan, the right of the doctor to charge the patient more than the fixed fee, and state refund to the patients rather than direct collection by the doctor from the state fund. With these modifications, nearly all physicians in the country are practising under the act, although the organized profession and the Government have not been co-operating to the extent necessary for a proper functioning of the scheme.

Health policy of the Labour Party.—The New Zealand Labour Party won a decisive victory in the general election of November, 1935, and has governed the country continuously since that time. Like the Labour Party in the United Kingdom, it is a non-doctrinaire and mild socialist party, more inclined to extend social security than to transform society. Its health program was only one unit among a number of new and expanded social services. In Labour's election manifesto of 1935, a "National Health Service" is promised, that would:

"(a) Give every citizen the right during ill-health to call in his own medical practitioner, to consult and receive the services of specialists where required, and by the reorganization of our Hospital System, to make available all other services that are necessary for the restoration and maintenance of health.

"(b) Extend the Home Nursing Service so as to provide all the attention necessary for mothers and other members of families when it is not convenient for them to leave their own homes. The Labour Government will provide the necessary laboratory facilities to maintain the efficiency of the services, together with adequate payment to practitioners and others who carry out the work. The service will be available for every family."

Another section of the manifesto contained the declaration: "Health services should be made as freely available as educational services".

Attitude of the medical profession.—The medical profession of New Zealand was ill prepared to deal with popular and political demands for a national health scheme. A thoughtful warning had been given in early 1935 by Dean C. E. (now Sir Charles) Hercus of the Medical School, University of Otago. He told of the sorry plight of the British medical profession at the time Lloyd George brought into Parliament health insurance legislation. In country after country the profession failed to provide effective leadership in the formation of health plans. Dean Hercus concluded:

"No lesson stands out more clearly than that the profession should keep in the closest touch with those engaged in drawing up even tentative schemes and should

be prepared to advise and direct development along the lines which are essential to the sound practice of medicine."

Although the British Medical Association, New Zealand Branch, (hereafter B.M.A.) did establish a "national health insurance committee", brought Sir Henry Brackenbury out from England to consult, and carried on a lively discussion of issues in its *Medical Journal*, the profession neither proposed a realistic, comprehensive scheme itself nor did it manage to maintain close contact with the Government while the provisions of the Social Security Act were being formulated.

In April, 1938, the Prime Minister submitted to a select committee of the House of Representatives a memorandum containing the Government's social security proposals. Concerning health services, the "white paper" read as follows:

"(1) The Government proposes to provide: (a) A universal general practitioner service free to all members of the community requiring medical attention. (b) Free hospital or sanatorium treatment for all. (c) Free mental hospital care and treatment for the mentally afflicted. (d) Free medicines. (e) Free maternity treatment including the cost of maintenance in a maternity home.

"(2) The Government further proposes that these services should be supplemented, when organization and finances are available, by the following additional services: (a) Anaesthetic. (b) Laboratory and radiology. (c) Specialist and consultant. (d) Massage and physiotherapy. (e) Transport service to and from hospital. (f) Dental benefit. (g) Optical benefit.

"(3) It is also proposed to institute a free home nursing and domestic help service when the necessary staff has been trained to make such a proposal practicable.

"(4) Complementary to the foregoing proposals, the Government contemplates an extended educational campaign for the promotion of health and the prevention of disease."

HEALTH BENEFITS UNDER THE SOCIAL SECURITY ACT

Health benefits were provided for under Part III of the Social Security Act, 1938. Five classes of health benefits are defined in the act: (1) medical, (2) pharmaceutical, (3) hospital, (4) maternity, (5) supplementary. The inaugural rate for any benefit was to be fixed by the Minister of Health. All persons ordinarily resident in New Zealand are eligible for health benefits. Funds to finance the whole Social Security scheme are raised by a flat tax on all income (originally 5%, now 7½%). Additional moneys needed to finance the whole social security program, monetary as well as health benefits, are secured by transfer from the Consolidated Fund of the State.

A mere summary of the act gives insufficient emphasis on its principles and characteristics. The law anticipated a *universal coverage* of the total resident population, regardless of economic status. In this respect it pioneered,

for British and other health insurance schemes up to that time provided for limited coverage only, usually employed workers receiving less than a stated yearly wage. The original British health insurance left out not only families, but also omitted the unemployed and the employed who made more than the stated wage. The New Zealand act was also unusual in that it was *non-contributory*, benefits being made available to all as a matter of right, regardless of whether or not taxes were paid for the purpose. New ground was broken, also, in the *comprehensiveness* of the benefits provided for. Nearly every conceivable contingency was anticipated and an appropriate benefit defined. Never before in history, with the possible exception of Russia, had more complete cradle-to-grave protection been afforded to a people.

In January, 1939, the Minister discussed with B.M.A. representatives the possibility of providing health benefits on the basis of fee-for-service, but the profession was unwilling to make suggestions or proposals. Beset with administrative problems connected with launching this huge program, the Department of Health moved slowly. The first benefit, free treatment in state mental hospitals, was put into force April 1, 1939, without opposition.

Maternity benefits.—The second class of benefits, maternity, was made available May 15, 1939. The services of hospitals, nurses, and physicians were involved under maternity benefits. The main provisions for maternity medical services, as revised, are as follows: (1) a scale of fees is fixed by agreement between the Minister and the B.M.A.; (2) "every doctor affording services covered by the scale of fees must accept the fees from the Fund in full satisfaction of the claim for the services" with two exceptions; (a) doctors who notify the Minister they will not provide services under the act, and (b) obstetric specialists who are permitted to charge the patient over and above the basic fee.

The basic medical fee for maternity cases was set at £5 5s, and was raised to £6 6s in 1946, and appears to be considered reasonable by the medical profession.* In order to collect the full maternity fee, the doctor must report five ante-natal and one post-natal attendances, and must have been present at delivery. Obstetrical specialists are those so recognized by the Minister. Application for such status is made by a practitioner; a recommendation is made by the B.M.A., and the Minister makes the final decision. Among the criteria used are proportion of practice devoted to obstetrics and membership in the Royal College of Obstetrics and Gynaecology. In 1940, twenty-two were recognized as obstetric specialists. Only

* It is very difficult to compare New Zealand and American and Canadian professional fees. On the current exchange, N.Z. £ = U.S. \$3.26.

specialists may charge a patient more than the basic fee of £6 6s.

Hospital services for maternity cases are free or partially free, depending on the ownership of the hospital and the terms of the contract between the Department and the particular institution. Hospitals operated by public Hospital Boards and the state-owned St. Helen's Hospitals (located in the four main cities) accept the social security payment as payment in full. Private maternity hospitals, almost without exception, have entered into contracts with the Department. The basic charges that may be claimed from the fund are £2 5s. for the day of delivery and 12s. 6d. per day for up to 14 days of hospitalization.

The third type of maternity benefit, obstetric nursing in the patient's home, makes possible proper attendance in cases where a hospital is not used. Provision is also made for delivery by mid-wives.

Maternity benefits have been the most satisfactory of the main classes of health benefits under the Social Security Act. They are comparatively easy to administer and difficult to abuse. An absolute check over practitioner, patient, and hospital exists in the form of birth records. Perhaps greatest public support would be given to this aspect of health benefits, thanks in part to the great educational work done by Dr. Sir Truby King, and the monuments of his endeavour—the Plunkett movement and the Karitane nurses.

Hospital benefits.—Hospital benefits for other than maternity cases, became effective for in-patient treatment on July 1, 1939. In practice, this means that hospitalization is free in public hospitals run by Hospital Boards and in semi-public hospitals like the Karitane Baby Hospitals. Private hospitals may collect from the fund 9s. per day per patient allowed to Board hospitals, and from the patient whatever extra charge is approved by the Minister. The amount allowed varied with the accommodations provided, e.g., private room, two-bed, or four-bed rooms. Out-patient treatment by Board hospitals was included in hospital benefits beginning March 1, 1941. The fund simply subsidizes the Hospital Board operating an out-patient service with a grant covering 60% of costs of that service.

MEDICAL BENEFITS. INTRODUCED IN 1941

A. *Capitation plan.*—The first big jump was made on March 1, 1941, when medical benefits under the capitation scheme were made available. People were entitled to choose medical practitioners and to enter into agreements with them for general medical services, excluding maternity and specialist services. The fund would compensate co-operating doctors at the rate of 15s. per year for each man, woman, and child on the practitioner's list, or panel. The

doctor is also entitled to receive a mileage allowance for each patient residing from three to twenty miles away. The procedure is similar to that under the British health insurance scheme. The patient had free choice of doctor and the doctor could accept or reject patients. No limit was placed on the number of patients a doctor could have under the capitation plan. Capitation is still in operation, but has declined fairly steadily in use. In some sparsely settled areas, capitation appears to have worked well.

B. *Fee-for-service system.*—Soon after the capitation plan was inaugurated, it became obvious that the medical profession would not co-operate under that system to an extent sufficient to get medical care to all of the people. The Government then began to consider seriously the instituting of a fee-for-service plan. Its initial proposal was for a fee of 5s. per attendance in the doctor's surgery and 6s. 6d. in the patient's home. There was an outcry in the profession. Eventually the Government compromised on two points. The scale of fees was raised to 7s. 6d. for an ordinary weekday consultation, in either office or home, and to 12s. 6d. for a night or Sunday call. The right to charge over the fixed amount was also granted. The fee-for-service system was put into effect on November 1, 1941.

1. *The refund plan.*—Professional services are rendered and the patient billed for the customary amount. On receiving payment, the doctor issues a receipt to the patient, who could submit it, along with an appropriate form, and secure a refund of the fixed amount allowed from the fund. A common fee for an ordinary daytime consultation is 10s. 6d. (half a guinea) which the patient pays to the doctor and receives a receipt, submits the receipt and proper form, and gets back from the fund the 7s. 6d. allowed. A committee of the B.M.A. summarized the advantages of this system as follows:

“This method causes the least interference with normal conduct of practice. The relationship of doctor and patient is not intruded upon by any interested third party. The doctor can give his patient the attention and service he requires, and graduate his charges thereto. The patient retains some responsibility for his own treatment.”

The Department of Health has found the refund system difficult and very expensive to administer. Around 30% of the refund forms are incorrectly filled out by patients, necessitating further correspondence and delay before payment can be made.

2. *The direct claim plan.*—Direct claim, generally called fee-for-service in medical circles, means that the doctor provides services for the patient, secures the patient's signature on the appropriate form, which the practitioner submits to the Department of Health in order to receive remuneration from the fund. He accepts such compensation as payment in full, and receives nothing from the patient directly. The

Government favours this plan, for it greatly simplifies the administrative procedure and is less costly. The forms submitted by the doctors, with few exceptions, are correctly filled out.

3. *The token system.*—Out of the fee-for-service plan, with its provision for remuneration either by refund or direct claim, emerged a third variation which combines features of both. The doctor makes a direct claim for the statutory fee on the fund and also receives an additional payment from the patient. The profession has given this mixed method of remuneration the name of "token". A common example of token is for the doctor to charge 3s. above and beyond the amount he will collect directly from the fund.

From the Department's point of view, token is preferable to refund, largely because direct claims from doctors are easier to pay and cheaper to administer than refund applications. The patient has every reason to favour token over refund, because he is relieved of the necessity of filling out forms and going to the Post Office to cash his warrants.

C. *Salaried service.*—The Social Security Act empowers the Minister of Health to make special arrangements in order to provide medical services for people living in remote areas. This has been provided mainly by salaried medical officers. The base salary is high enough to attract young doctors into sparsely populated back-blocks that would have little chance of medical service under ordinary conditions. The salaries offered range from £1,100 to £1,700 per year, and the doctors are also permitted to charge fee-for-service for patients not ordinarily resident in the district. Eighteen physicians were in the salaried service in 1946.

One critic of the New Zealand system of medical care regards salaried personnel for remote areas as "logical and satisfactory".

ADDITIONAL FEATURES

Pharmaceutical benefits were introduced in May, 1941. This has meant the setting up of a large staff to price prescriptions and reimburse pharmacists. It is estimated that about 90% of all prescriptions in the country are paid for by the fund. X-ray diagnostic services were started in August, 1941, and now this benefit includes private practitioner x-ray work, which is divided into two classes, depending on the quality of the work done. Massage and district nursing benefits are included, and in certain cases domestic assistance will be provided.

School medical services have been expanded to include free milk and apples in the schools, health camps and aggressive health education campaigns. During 1946 horse racing enthusiasts attributed the lack of light weight jockeys for racing, to the school milk campaign.

The dental services are extremely comprehensive, including dental nurses and free service up

to the age of 19. The nurses were developed in order to supplement the shortage of dentists: they do extractions and fillings and much routine work. This development is fully supported by the dental profession.

MEDICO-LEGAL

THE LEGAL ASPECTS OF STERILIZATION

(Part II)

The case cited in the May issue may serve as the introduction to a short and necessarily incomplete discussion of the legal aspects of sterilization. What is its legal status? When is it legal, and when illegal?

In a general sense the usual rules about explanation of and permission for any diagnostic and therapeutic procedure apply to sterilization. It is necessary for the patient to know the nature and the results of the proposed treatment; it is necessary for the patient, knowing these things, to give permission for the procedure. Because emergencies seldom or never arise when sterilization is a life-saving measure it never need be done without permission. If it may be necessary as a part of some operation the possibility should be explained to the patient before the operation.

In a particular sense *sterilization is legal when it is an incidental part of a medical or surgical procedure necessary for the preservation of the life or health of the individual*. Under all other circumstances, sterilization is illegal and the doctor who does it under any other circumstances, because he is doing an illegal act, exposes himself to the risk that he may be sued, not for malpractice or negligence in a professional sense, but for common assault and battery and he may, therefore, be deprived of the protection of the Medical Act.

Some discussion and amplification of the particular rule may be helpful. That sterilization is legal when it necessarily results from a procedure which must be done to save life requires little comment. Malignancy of the uterus, of the testicles or penis, exsanguinating hæmorrhage, acute or chronic, because of uterine fibroids, these and a number of other conditions all require for their cure or eradication treatment which coincidentally means sterilization. No treatment other than that involving sterilization incidentally has any hope of success. Even under these circumstances, however, an explanation of the proposed procedure and its necessity, adapted to the individual's understanding and sufficiently clear to allow understanding, should be made to the patient and in some cases to the marital partner. Permission should be obtained after the explanation and

it should be written, dated, and witnessed. This may be a part of the usual operative consent or may be a separate consent appropriately drawn.

Much more thought and care are necessary in the understanding and application of the rule to the group where sterilization is legal because it is done for the preservation of the health of the individual. The words "necessary for the preservation of health" should be applied literally, always. Reasons here must always be reasons, not excuses; they should be such that any reasonable doctor could accept them and defend them if need arose. There should always be a consultation at which the consultant is allowed to arrive independently at his own decision and, if he agrees, both doctors should write their reasons and opinions. Explanations should be particularly clear and the permanence of the resulting sterility stated emphatically. Only then should permission be sought, from both husband and wife; if obtained it should be in writing, it should be dated, signed, and witnessed.

Voluntary sterilization of the healthy is a wholly separate and different problem. Excluding from the discussion those cases covered by one or two Provincial Acts allowing sterilization under specific conditions, voluntary sterilization of the healthy must be considered wholly illegal. Under British law it is considered in the best interests of the individual and the state for each individual to retain his or her procreative powers. Requests from healthy individuals, man or woman, for sterilization must be refused, promptly and finally.

Too many doctors feel that signed permission protects them against any legal consequences of their act. One cannot obtain "permission" to perform an illegal act. Voluntary sterilization is illegal. Therefore no "permission" may be granted for it and the signed permission or request of the person wishing sterilization probably would not stand up in court if it were questioned later. No "reasons" could be brought forward for having performed voluntary sterilization, no life was saved and no health preserved by it. The person whose life was saved or health restored by an operation which incidentally resulted in sterilization may regret the sterility but cannot question the need for it or sue successfully for damages because of it. But the person for whom neither of these things is true, if he or she regrets it later, is likely to sue and it is very unlikely the doctor could defend himself successfully.

Doctors need to keep clear in their own minds the fact that patients desiring sterilization have only excuses for getting it done, not reasons. There can be no reason for sterilizing a man who wishes to protect his invalid wife against further pregnancies, there

may be reasons why she should be thus protected, but his sterilization is wholly unjustifiable. How can the doctor defend himself should action be brought against him later because the husband wants children with a second wife after his invalid wife's death? There can be no reason for sterilizing a woman because she thinks she wishes no more children. How can the doctor defend himself should action be brought against him later because the woman desires more children, having lost her others, or having remarried after having been widowed? A little clear thought will show the indefensibility of the position of a doctor who has done either of these things.

To sum up: sterilization of an individual is subject to the same rules, having to do with explanation and permission, that apply to any other medical procedure. It is legal when a necessary part of a life-saving procedure and its necessity should be explained to the patient, and sometimes the marital partner, and written permission should be obtained. Sterilization for the preservation of health should be preceded by careful thought, by consultation, by written opinion of the doctors stating their reasons, by the signed and witnessed permission of both marital partners. Voluntary sterilization of the healthy should never be done.

THE CAMSI COLUMN

Remuneration for Interns

The following report appeared in the June (1948) edition of *The Canadian Hospital*. It should prove of considerable interest to the medical students across Canada.

"Renewed attention has been directed to this frequently raised subject as a result of the resolution passed in November last at the Kingston meeting of CAMSI. This resolution favoured the principle of remuneration to interns and recommended the setting up of a joint committee with the medical profession and hospital administration to discuss this. At the request of CAMSI, representatives of the Canadian Hospital Council and of the Canadian Medical Association met with Rodger M. Hines, President of CAMSI, to review the situation. Of the hospitals approved for internship by the Canadian Medical Association it was found that all of the non-teaching hospitals taking graduate interns now pay their junior interns varying amounts, the predominant amount being \$50 per month plus maintenance. The range is from \$25 per month to \$100. There is some variation among the teaching hospitals. A number of the teaching hospitals pay junior (graduate) interns from \$8.50 to \$25 per month plus maintenance, but several of the large teaching hospitals do not provide cash allowances. Most of the teaching hospitals pay second year interns \$25 to \$50 per month, but here also a few of the leading hospitals make no cash payment.

"To obtain some idea of the thinking in the hospitals concerned, the secretary of the Canadian Hospital Council wrote to the administrators of those teaching hospitals which do not make cash allowances to their junior graduate interns and the assistant secretary of the Canadian Medical Association wrote to the medical staffs of those hospitals, at the same time.

"Question One.—In view of the rising costs of living and the increased level of other hospital salaries, do you think this request of CAMSI that all hospitals should give first year graduate interns a small honorarium in addition to maintenance to be a reasonable one?

"Replies.—Of the 9 replies received from the medical staffs of teaching hospitals not now paying junior graduate interns, 6 favoured some remuneration and 3 were not in favour. Of the 11 replies from administrators, 7 expressed approval and 4 considered maintenance alone as adequate. It should be noted that, in a number of instances, the administrators were giving a personal opinion only and could not be considered as having committed their hospitals to a change of policy.

"Question Two.—If the general reaction of those teaching hospitals not now paying first year graduate interns would seem to be favourable towards giving some cash remuneration, what amount would seem to you to be reasonable? \$25 per month? More? Less?

"Replies.—\$25 per month for junior interns was the prevailing answer from both administration and medical staffs. (Two hospitals suggested \$100 per annum.) Seniors might be given \$35 to \$50 and residents from \$500 per annum to \$100 per month.

"The subject is one with several facets. It is becoming increasingly difficult for the medical graduates, many of whom are married, to take the ever-lengthening postgraduate work now required in so many fields of medicine. The rising cost of tuition and of maintenance and the lessened summer opportunities for financial recuperation have complicated the situation. The 1947 questionnaire on intern economics revealed the seriousness of the situation, even after making a mental reservation that those replying may have exaggerated in some cases their inability to go on without financial assistance. It must be borne in mind, too, that this is a period of inflated wages and of subsidized training in nearly all other fields. On the other hand it must be borne in mind that the junior internship is really part of the medical man's training, even though it be after graduation in about half of our schools; that the keeping of interns is quite an expensive item to the 10% of hospitals taking interns and the administration would willingly reduce the number accepted; and that hospitals are having a particularly bad time at present because of the unprecedented rise in costs of operation.

"On the whole CAMSI would seem to have presented a good case. Both the medical and hospital representatives on the joint committee were pleased to note that the students were making a request, not a demand. The situation was not helped in the Montreal and Maritimes areas by a feature article in *The Standard* which drew an emotional picture of the overworked, underpaid interns which had been written by a reporter permitted to attend the CAMSI discussions. However, the CAMSI President wrote to a number of hospital administrators in that area regretting the 'one-sidedness' of the article and pointing out that CAMSI neither initiated nor approved the article."

It is to be noted that this report reveals an attitude towards remuneration that is an advance over that held a few years ago. Even those administrators who expressed disapproval of the remuneration principle based their stand, for the most part, on the fact that most of their junior interns were considered to be undergraduates. At least one of the hospitals expressing approval has already instituted remuneration to interns to the extent considered reasonable as shown by their answer to question 2. This amount is below what CAMSI considers adequate but it does indicate a break with a policy that is out of date, namely that teaching alone is sufficient remuneration for the graduate intern.

The need is urgent and it is hoped that hospital administrators, the majority of whom admit the reasonableness of our request, will take steps to inaugurate payments of the amounts they have suggested are just.

R. M. HINES, *President*

MEDICAL SOCIETIES

Halifax Medical Society

At the Annual Meeting of the Halifax Medical Society the following slate of officers was elected for the coming year: *President*—Dr. H. D. O'Brien; *Vice-president*—Dr. V. O. Mader; *Secretary-Treasurer*—Dr. J. F. L. Woodbury; *Executive*—Drs. D. J. MacKenzie, L. Rosere, C. L. Gosse, C. S. Elliot, and J. A. Noble.

Nova Scotia Society of Ophthalmology and Otolaryngology

The Nova Scotia Society of Ophthalmology and Otolaryngology has been recently formed and will hold its first meeting at Keltic Lodge in conjunction with the meeting of the Medical Society of Nova Scotia this autumn. The following are the officers: *President*—Dr. J. P. McGrath, Kentville; *Vice-president*—Dr. B. E. Goodwin, Amherst; *Secretary-Treasurer*—Dr. E. I. Glenister, Halifax; *Executive*—Dr. H. J. Davidson, North Sydney, Dr. C. K. Fuller, Yarmouth, Dr. H. R. McKean, Truro, Dr. D. M. MacRae, Halifax.

Quebec Division of the Canadian Medical Association

The 10th annual meeting of the Quebec Division of the Canadian Medical Association in some respects reached a high-water mark level in the history of the Division. This year it was held for the first time in the City of Sherbrooke, which provided probably the most conveniently situated meeting place in the Province. Furthermore, Sherbrooke is one of the most rapidly growing cities in Quebec, and the hospital facilities are ample for a medical meeting. Add to all of these the organized efforts of a committee which had been devoting itself to preparing the meeting for many months beforehand, and the successful result might almost be regarded as a foregone conclusion. The crowning mercy of unclouded spring weather was undoubtedly a strong contributing factor to the success of the meeting. The scientific program was divided between two hospitals, the St. Vincent de Paul and the Hôtel-Dieu. Special care had been devoted to arranging that the bilingual aspect should be well preserved. Whilst a detailed account is not possible, it may be said that the papers maintained a high level, showing both variety and timeliness of application. The traditional hospitality of the hospital sisters was exercised to an almost embarrassing degree. At the final luncheon meeting an unusual feature was the introduction of a case report for diagnosis for which prizes were offered by the various commercial exhibitors. This proved to be a most attractive and entertaining feature, bringing out a great variety of diagnoses. The commercial exhibits, it must be added, were strikingly well arranged. The attendance was extremely good, and the close attention during the scientific sessions was a proof of their high quality.

Saint John Medical Society

The monthly meeting of the Saint John Medical Society, in April, discussed the ethics of the appointment of examining physicians, by various civic departments. One of the principles debated was that of free choice of physicians by civic employees. Dr. A. L. Winsor of Norton, introduced the discussion of the proposed new section in the C.M.A. devoted to General Practitioners. The society went on record as being unanimously in favour of such a section.

Dr. Douglas Gibbon was the special speaker and he discussed "The Care and Feeding of the New Born".

Dr. Gibbon spoke with authority on this subject and illustrated his points with graphs, and spiced his remarks with shrewd understatements, sharp criticism of carelessness and smiling negations, all delivered with an inflected oratory associated with this speaker, among his colleagues. The winter's program has brought before the society three speakers from a distance and three local speakers. The officers of the Society deserve much credit for the high standard maintained this year.

Calgary Medical Society

Dr. Morgan presented the President's report for the past year. The Society had lost three valued members, Drs. McEachern, Saunders and Martin. The affiliation of the Calgary District members with our Society had proved beneficial and would be recognized by a change in our constitution. It was proposed that the interest from the Benevolent Fund be used to bring more outstanding speakers from other outside points to the Society in the future. Life membership had been presented to Dr. Roach and Dr. Shore. Speaking teams from our Society to go to outlying districts should be kept in mind for the future. One such meeting had been held at Banff in February. The annual dinner had been a mixed one this year and appeared to be well received by all members and it was hoped that this precedent would be carried on.

Nominations for the 1947-48 officers of the Society were presented by Dr. Baker with Dr. H. V. Morgan as Past President, Dr. R. C. Riley President, Dr. L. M. Fairburn Vice-president, Dr. W. Johns Secretary, Executive Members Drs. P. Clarke, J. Porter, H. E. Gibson, Jr., S. Gelfand, and Assistant Librarian Dr. W. Prowse. It was also suggested that three rural members be added to the present executive and nominations for this were Dr. M. Harvey of Olds, Dr. D. A. MacKenzie of Banff, and Dr. N. E. Foster of High River. Dr. R. Hughes was nominated as Librarian and Dr. J. Follett as Treasurer.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec
23 janvier, 1948.

SURDITÉ ET FENESTRATION.—Paul Fugère.

Au début de son travail le docteur Fugère parle de la surdité en général et nous montre quelle place y occupe l'otosclérose. Cette maladie, dit-il est une lésion non suppurative de la capsule osseuse entourant le labyrinthe. Celle-ci est essentiellement caractérisée par l'absorption d'une région de la capsule labyrinthique et de son remplacement par un nouvel os d'aspect spongieux. Elle est localisée, règle générale, juste au-dessus et en avant de la commissure antérieure de la fenêtre ovale. Cette tumeur osseuse se manifeste cliniquement par une surdité surtout marquée pour les basses fréquences. La conduction osseuse est normale ou même augmentée. Le Rinne est négatif. Le Weber latéralise du côté le plus sourd. En plus, comme le phénomène de récupération n'est pas présent, la limite entre le suil d'audition confortable et le suil d'audition douloureuse, est assez grande et permet aux gens qui en sont atteints de se servir assez avantageusement d'un appareil auditif.

Suit ensuite une description de l'audiomètre et les indications de l'audiogramme. En passant, le docteur Fugère suggère l'établissement ici, au pays, d'une clinique pour la prévention de la surdité. Tous les sourds y seraient dirigés selon leurs besoins soit vers le chirurgien, soit vers les représentants d'appareils auditifs, soit enfin, vers une institution où l'on enseigne à lire les lèvres. Quant au traitement chirurgical de l'otosclérose, il donne une réception auditive supérieure à celle que procurent les meilleurs appareils. Cette

opération consiste à faire une fenêtre sur la partie ampoulaire du canal horizontal pour permettre aux ondes sonores d'atteindre le nouveau l'oreille interne. Cette opération commencée par Barany en 1904 fut grandement améliorée par Lempert qui obtient aujourd'hui environ 60% de résultats permanents.

Il termine son travail en disant que le sourd peut aujourd'hui être grandement aidé et souvent même guéri. De nouveau il peut vivre dans la société des hommes et gagner honorablement sa vie.

CONSIDÉRATIONS SUR LES TUMEURS OSSEUSES.—Ls-Ph. Roy et J.-Louis Larochelle.

Les auteurs donnent quelques mots sur les symptômes et le traitement de l'ostéo sarcome d'Ewing, leurs statistiques sont décevantes, ils ont constaté que tous leurs cas furent traités plusieurs mois après le début de la maladie et comme conclusion ils sont convaincus que le diagnostic précoce seul peut donner au patient quelques chances de survie, si un traitement énergique et radical est institué immédiatement. Ils croient que la biopsie est le moyen le plus rapide et le plus sûr de porter un diagnostic, et que de plus, ce moyen est une garantie pour le médecin tout spécialement lorsqu'il est dans l'obligation d'amputer un membre.

L'EMPLOI DES GREFFES CUTANÉES DANS L'ILÉOSTOMIE.—E. Samson.

Certaines complications de la colite ulcéreuse requièrent un traitement chirurgical. L'iléostomie tel que pratiqué antérieurement se complique très souvent d'irritation de la peau difficile à contrôler. L'iléostomie avec greffe de peau tel que préconisé par Dragstedt a certainement des avantages que nous avons constaté chez une patiente chez qui nous avons utilisé cette technique.

Norfolk County Medical Society

At the regular meeting of the Norfolk County Medical Society held in the General Hospital, Simcoe, Ont. on April 26, Dr. Douglas Taylor of Toronto gave an illustrated address on the subject, "Arthritis". At the same meeting, Dr. M. C. Harvey of Kitchener, Ont. spoke on "Physician's Services Inc."

Vermilion Medical Society

The following is a report of the regular meeting held in Vermilion on April 28: The following were present: Dr. E. Watts and Dr. W. Bramley-Moore of Edmonton; Drs. Y. Yoneda and R. Reed of Vegreville; Drs. W. R. Bell, R. Ringwood, M. A. R. Young and J. Alton of Lamont; Drs. J. Dickout and J. Hemstock of Lloydminster; Dr. D. Hasinoff of Manville; Dr. N. Winnoty of Two Hills; and Drs. C. W. Stephens, A. C. Bradford and A. B. King of Vermilion. The president, Dr. C. W. Stephens was in the chair. Following a banquet the business meeting was held.

Dr. E. Watts gave a very informative talk on some of the newer advances in anaesthesia touching mainly on the use of Curare, new uses for Procaine, Musical Anaesthesia, some advances in Obstetrical Anaesthesia and the use of Rectal Pentothal in children. This talk was very well received and there was considerable discussion. Then two movie films were shown—"Purposeful Splinting"—showing simple methods of splinting the hand for various injuries, and "Case of Compound Fracture of the Skull". Following this there was a lengthy discussion, led by Dr. Bramley-Moore and Dr. Young, regarding the Proposed Prepaid Medical Scheme being introduced by the College. Progress was reported and Dr. Young stated that further news of the exact form of contract would be sent to all members of the profession in the near future.

Toronto Academy of Medicine

The Annual Meeting of the Toronto Academy of Medicine on May 4 marked the end of a successful year. The membership now consists of 931 active members, non-resident active members 276, associate members 299, honorary, life and corresponding members bring the total to 1,569. The increase in the annual fees adopted a year ago had a very slight effect upon the membership and enabled the treasurer to report a creditable balance for the first time in several years. A building fund account has been opened and plans have been drawn for an extension to the Academy building which will provide a much needed auditorium and additional stack space for the library. The number of volumes now in the library is 33,144 and includes 519 books purchased or donated during the past year.

The officers for the session 1948-49 are as follows: *President*—Dr. W. A. Burr; *Vice-president*—Dr. A. R. Hagerman; *Secretary*—Dr. J. W. Ross; *Treasurer*—Dr. E. C. Fielden.

On April 6 the Toronto Academy held its Annual Library and Historical Night. This is an occasion on which Fellows of the Academy bring their wives and other guests. The special events of this meeting were an address by Dr. W. J. Deadman on "Seventeenth Century Medicine" and the presentation of a silver tea service to the Librarian, Miss Poole. Miss Poole had completed twenty-five years of service in the Academy. The esteem in which Miss Poole is held suggests a paraphrase of a saying of an ancient bishop concerning the strawberry, "Doubtless God could have made a better librarian but doubtless God never did".

Another special event of the same evening was the presentation to the Academy of two portraits. Rt. Rev. Canon Cody, Honorary Fellow of the Academy, unveiled the portrait of the late Dr. H. B. Anderson presented by Mrs. Anderson. Dr. T. C. Routley in a felicitous speech asked the President to accept the portrait of Dr. Robert J. Noble, Past President of the Academy and Registrar-Treasurer of the Ontario College of Physicians and Surgeons. These paintings are notable additions to the growing collection of portraits belonging to the Academy.

College of Physicians and Surgeons of Ontario

The College of Physicians and Surgeons of Ontario held its Annual Meeting in Toronto April 14 to 16. The Committees on Education and Legislation had difficult problems to consider which will interest the profession in Ontario when the annual announcement is published. The discipline committee reported a very satisfactory state of affairs. It had no charges of any sort before it so the practitioners of Ontario are to be congratulated on a year of good conduct. Dr. R. P. Smith of Timmins was elected President and Dr. R. J. Noble re-elected Registrar-Treasurer.

Ontario Medical Association District No. 3

Dr. W. V. Johnston Counsellor for Ontario Medical Association District No. 3 presided over the Annual Meeting of the district held in Shelburne on May 5. Dr. John Hepburn addressed the meeting on Coronary Infarction and Dr. F. G. Kergin discussed The Diagnosis and Treatment of Acute Abdominal Conditions. A business session followed and in the evening Mr. T. G. Jaycocks was guest speaker at a dinner largely attended by the members and their wives.

Ontario Medical Association District No. 6

The Annual meeting of District No. 6 of the Ontario Medical Association was held in the General Hospital, Belleville on April 28. The morning session was taken up with case presentations by local members and, in the

afternoon by guest speakers from Montreal. Dr. E. Jameson Martin spoke on Diagnosis of Breast Tumours, Dr. Neil Feeney on Coronary Insufficiency and Dr. Kenneth MacFarlane on Endometriosis. The proceedings were conducted by Dr. H. V. Dobson of Peterborough Counsellor for the district and Dr. R. M. Anderson of Belleville and Dr. W. H. Birks of Bowmanville vice-counsellors.

Essex County Medical Society

The Essex County Medical Society held its annual Clinic Day in Windsor on April 21. The guest speakers were Dr. Frederick Henry Amendola of New York and Dr. Newell W. Philpott of Montreal. Dr. Amendola lectured in the morning on Management of Carcinoma of the Colon and, in the afternoon, on Massive Haematemesis. Dr. Philpott spoke on the Accidents in the Last Trimester of Pregnancy and on the Changing Obstetrical Practice. Dr. Harold Asselstine of Windsor read a paper on the Modern Trend in the Treatment of Hypertension and Dr. G. White gave a demonstration clinic in the Children's Ward of Hotel Dieu Hospital. The subject of Indigestion was discussed at a round table conference in the afternoon by a panel of local doctors.

Simcoe County Medical Association

The Annual Meeting of the Simcoe County Medical Association was held in Barrie on May 26. After a dinner held at noon there was a short business session followed by addresses by Dr. H. F. Robertson on Diagnosis and Treatment in Diseases of the Anus and Rectum and by Dr. Irwin Hilliard on the Etiology and Treatment of Chronic Bronchiectasis and Bronchial Asthma. Afternoon tea with the ladies at the close of the meeting made a happy ending to a very successful meeting.

Lincoln County Medical Society

The Lincoln County Medical Society had a series of stimulating programs in recent months. In March, Dr. Ford Connell of Kingston dealt with the subject of Anticoagulants. In April the Present Status of Antibiotics was presented by Dr. Champ Lyons of New Orleans, La., and Dr. John R. Paine, Professor of Surgery, University of Buffalo. The Clinic Day in St. Catharines in May featured Functional Diseases of the Gastro-intestinal Tract. This was augmented by two notable papers on organic gastro-intestinal disorders. Dr. Sara M. Jordan of the Lahey Clinic spoke on the Problem of the Patient with Peptic Ulcer and Dr. Frank Lahey on the Problem of the Patient.

Winnipeg Medical Society

The Winnipeg Medical Society which held its annual meeting on May 21 has had a banner year. The secretary reported that the membership stood at 444 out of a total of 505 doctors in the city; the treasurer reported a worthwhile surplus, and the chairman of the program committee reported a record list of meetings. It was not surprising that when the results of the election of officers were announced their names led all the rest. Dr. C. E. Corrigan, the retiring president, gave a philosophical and scholarly address, livened with much humour, on "The Evolution of Disease". Honorary life membership was conferred on Dr. Fred A. Young, O.B.E., president of the Society in 1922-23.

At a special meeting on May 12, Lecture Theatre A in the Medical College was crowded to the doors to greet a former Manitoba graduate, Maxwell M. Wintrobe, now Professor of Medicine, University of Utah. Professor Wintrobe's address was entitled "The Studies of the Pathogenesis of the Anæmia of Infection". Dr. Win-

trobe was present at ward rounds in the Children's Hospital the following day and spoke at the clinical luncheon.

The new officers of the Winnipeg Medical Society for 1948-49 are: *President*—Dr. R. A. MacPherson; *Vice-President*—Dr. T. E. Holland; *Secretary*—Dr. K. R. Trueman; *Treasurer*—Dr. S. A. Boyd; *Trustee*—Dr. K. V. Borthwick-Leslie.

CANADIAN ARMED FORCES

Medical Services, Canadian Armed Forces

The Medical Directors of the Canadian Armed Forces Medical Services wish to thank the Editorial Board of the *Canadian Medical Association Journal* for their courtesy in making this space available for the printing of items of interest to the medical profession. It is considered that by such means it will be possible also to inform all medical doctors of the professional activities of the Services and also will establish a ready contact between civil and service medicine.

In keeping with the ever-growing conception that any efficient Defence Service must perforce be composed of all necessary components working together smoothly with perfect team play, the Inter-Service Medical Committee was organized over two years ago. This committee is formed by Directors of the respective Medical Services, Navy, Army and Air Force. The chairmanship is taken in rotation by one of the Medical Directors for a period of one year, and the secretary is appointed by the chairman, from his own Service. The committee meets weekly and discusses all matters that may have Inter-Service portent. Its function is to minimize and if possible eradicate all duplication, unhealthy competition, and encourage to the fullest, co-operation and co-ordination of the Medical Services of the Armed Forces. It would be quite wrong to intimate that knotty problems do not at times arise but when they do they are discussed frankly and without prejudice and it is considered that this Committee makes a definite contribution to the functioning of the Medical Services of the Armed Forces.

An announcement of unusual interest has been made from National Defence Headquarters to the effect that veteran medical students due to graduate in 1949 are eligible for commissioning in the medical branch of one of the Armed Forces. If selected for such commission, the student will draw pay and allowances of his rank, be supplied with textbooks and such instruments as he may require during his final year, and have his final year's university fees paid by the Department. Those eligible and interested should consult the Dean of their faculty, or make direct enquiry from the Medical Directorate of the service of their choice at National Defence Headquarters, Ottawa.

Brigadier W. L. Coke, Surgeon Captain A. McCallum and Group Captain A. A. G. Corbet will be official delegates from National Defence Headquarters to the annual meeting of the Canadian Medical Association. In addition there will be official medical representation from the various commands and establishments.

Group Captain J. A. Mahoney of Air Force Headquarters, attended the Fourth International Congress on Tropical Medicine and Malaria in Washington, representing the Medical Services of the Departments of National Defence and National Health and Welfare.

The Medical Director General, Royal Canadian Navy, Surgeon Captain A. McCallum has been named as the official delegate of the Medical Services, Canadian Armed Forces, to attend the following International Medical Meetings: The International Committee on Military Medicine and Pharmacy, Stockholm, Sweden, August 18 to 20, 1948; The 17th International Red Cross Conference, Stockholm, Sweden, August 20 to 30, 1948 and the Hungarian Medical Celebrating Week, Budapest, Hungary, September 4 to 12, 1948. In addition Surgeon Captain McCallum will attend the British Commonwealth Official Medical Historians Liaison Committee Conference, Oxford, England, August 3 to 7, 1948.

The 19th Annual Meeting of the Aero Medical Association was held in Toronto, June 16, 17 and 18. The R.C.A.F. participated through extending the use of the facilities of their Institute of Aviation Medicine and by a scientific exhibit relating to the work of the Institute.

The Convention of the Canadian Public Health Association recently held in Vancouver was attended by representatives of the Medical Services, Canadian Armed Forces. The official delegates were Lieut.-Col. E. J. Young, R.C.A.M.C., the Inter-Service representative on the Technical Advisory Committee on Public Health Laboratory Services, and W./C. G. D. Caldbick, R.C.A.F., who delivered a paper on Diphtheria, and Surgeon Lieut. Comdr. J. W. Rogers of H.M.C.S. *Naden*, Esquimalt.

Dr. W. R. Feasby, Medical Historian, has been authorized to attend the British Commonwealth Official Medical Historians Liaison Committee Conference, Oxford, England, August 3 to 7, 1948.

CORRESPONDENCE

Prepaid Medical Services in Alberta

To the Editor:

A proposed agreement to be entered into between Alberta doctors and Medical Services (Alberta) Incorporated has been circulated for study. The object is a prepaid medical service for the Alberta public. Most of the proposals are good from the point of view of public and doctors alike. There is one section, however, namely Section X, which is alarming. The Board of Directors propose to reserve the right to adopt such rules as it may deem necessary, and we suppose will be able to alter or add to them when they consider this expedient. Whilst we realize that some such power is essential, we feel that there should be a limit and the limit should be carefully defined. It is to just such unlimited powers assumed by the Minister of Health in London that the British doctors have been objecting.

In part two of the proposed agreement, it is stated that the decision of the Board of Directors as to the correct interpretation of the terms and conditions shall be final and binding on the professional members. Again there is a parallel in the British National Health Act. British doctors are insisting on their right of appeal to the courts. Alberta doctors should insist on similar liberty of action.

Finally the agreement defines very clearly the professional members and the participating members, but it does not define the Medical Services (Alberta) Incorporated which body could, it seems, in time change radically from its present form without reference to the other parties to the contract.

Nordegg, Alta.

R. WATSON, M.D.

Need for Nursing Literature

To the Editor:

Among the refugee population in Germany, Austria, Italy and the Middle East there are many hundreds of nurses and midwives for whom no provision can be made for nursing text-books or periodicals. These nurses are engaged in hospital or sanatorium duty or in public health work in the refugee camps, and all hope that they will ultimately be resettled in their profession in new countries, and therefore appeal through your pages to nurses throughout the world for donations of nursing literature both to assist them in their current duties, and to keep them informed of modern thinking in the desirable nursing world outside the refugee camps.

Donations of nursing literature published in English, German or French will be gratefully received, and should be addressed to the Chief Nurse, PCIRO Headquarters, Palais des Nations, Geneva.

Thanking you in anticipation of your assistance in publishing this appeal.

J. S. Haines, Chief Nurse for R. L. Coigny, M.D.,
Director of Health.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

THE B.M.A. MOVES

The second plebiscite organized by the British Medical Association has shown that, though still divided on the subject, an increased number of doctors are prepared to co-operate in the working of the new health scheme. As the figures did not show the majority of 13,000 general practitioners against acceptance of the scheme the B.M.A. had decided was necessary to justify the profession in refusing to co-operate in the scheme, the Council of the Association recommended the representative body of the Association to advise the profession to co-operate in the scheme. This recommendation was keenly debated at a special meeting of the representative body, but in the end it was accepted, although a rider was added that the profession only accepted service under the Act on the understanding that, in the event of the amending Act and terms of service being unsatisfactory, members serving under the Act should hand in their resignations or take such other steps as were considered necessary by the representative body.

POSTPONEMENT?

Thus ends the penultimate stage of one of the most controversial episodes in the history of the medical profession in this country. The omens for the success of the Act are far from promising. The scheme is due to come into force on July 5, but little of the essential preliminary spadework has been accomplished. Terms of remuneration have not yet been settled; certain legal anomalies have not yet been cleared up, and there are no grounds for believing that the enabling Act promised by the Government can possibly reach the Statute Book by the appointed day. When, in addition, it is appreciated that there is an acute shortage of nurses resulting in many hospital beds being unusable, and that general practitioners are already rushed off their feet with work, the possibility of chaos does not appear very remote.

Impressed by the urgency of the situation, Sir Frederick Menzies, the distinguished former Medical Officer of Health of the London County Council, has appealed, in the columns of *The Times*, to the Minister of Health to postpone the introduction of the scheme

until January 1, 1949. That he is voicing the opinion of all responsible sections of the community, both medical and non-medical, is abundantly clear, but whether this opinion is synonymous with that of the Cabinet is another matter, and one upon which it should be possible to give an opinion next month.

CENTENARY OF PUBLIC HEALTH

With the characteristic British gift of never allowing political rancour to embitter public life, the heated controversy over the National Health Scheme has not been allowed to interfere with the celebration of the centenary of the passing of the first great English Public Health Act. As was only fitting, the lead in the celebrations was taken by the City of London, the first medical officer of health of which was Sir John Simon, whose name, along with that of Chadwick, stands pre-eminent in the annals of public health in this country. At a dinner in the library at the historic Guildhall the toast of the evening was proposed by Mr. Aneurin Bevan who had among his audience three former Ministers of Health—Lord Addison, Lord Kennet and Mr. Ernest Brown. The official celebrations had been initiated the previous day by Princess Elizabeth in opening a special exhibition organized by the Government to mark the occasion. By a sad coincidence these celebrations have been followed by the announcement of the death, at the age of 77, of Sir George Newman who, as chief medical officer of the Ministry of Health from 1919 to 1935, proved to be one of Sir John Simon's greatest successors.

THE TRAINING OF DOCTORS

Under this title the medical curriculum committee of the British Medical Association has just published a report which provides much food for thought. This committee, which has been sitting since 1945 under the chairmanship of Professor Henry Cohen of Liverpool, had a strong representation of general practitioners as well as teachers and consultants. Predominantly clinical in its outlook, it takes a strong line on the need for drastic revision of the pre-clinical period. Some of the comments it feels called upon to make are a sad commentary upon the present methods of medical education, e.g., "Examiners must be competent for, and experienced in their duties"!

So many similar reports have been published of recent years, with so little attempt to carry them into force, that many are becoming rather cynical as to their real value, but it is to be hoped that the contents of this report, taken in conjunction with the so-called Good-enough Report published some years ago, will at last impel the powers that be to take adequate action to ensure that the standards of medical education are at least such as would be worthy of the high standing of the universities of which our medical schools form integral parts. Too often at the present day the difference between a university and a technical college is not appreciated. Until this is done, and until it is recognized that the Faculty of Medicine is an essential part of a university, there is little hope of our maintaining the high standing of the medical profession in this country.

WILLIAM A. R. THOMSON

London, June, 1948.

Perhaps the most deadly form of fear is that which holds a person back from seeking early professional attention for an ailment. One of the worst features of cancer, for instance, is the fear it instils into people. Cancer can be cured, in most cases, and this is true of the majority of troubles. But all have to be attacked early. The thing to dread, is not the disease itself but the fear which paralyses the initiative to do the obvious—that is, to get help to fight it, at once.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Obesity. Gastineau, C. F. and Rynearson, E. H.: *Ann. Int. Med.*, **27**: 883, 1947.

Obesity, it is pointed out, is one of the most pressing and dangerous health problems existing today. Much can be accomplished to improve the health of the general population by a vigorous effort to encourage the obese to reduce. The development of obesity seems most frequently to depend upon a derangement of appetite control mechanism. Circumstantial evidence suggests that this mechanism may reside within the hypothalamus and that its functions may be considerably modified by the cerebral cortex. Obesity may result from the inheritance of an appetite control centre which demands more food for satisfaction. On the other hand, the important factor of environment cannot be ignored. Cerebral cortical function in the form of neuroses may modify the more automatic appetite control mechanism.

A few unusual forms of obesity are recognized. The postencephalitic forms result from injury to the hypothalamus. The Lawrence-Moon-Biedl and the Morgagni-Stewart-Morel syndromes are rare conditions depending upon heredity. Many other causes of obesity have been suggested but no good evidence exists for other than these already mentioned. No abnormal metabolism has been demonstrated in obesity.

Therapy depends upon the limitations of caloric intake. Endocrine products and diuretics are neither necessary nor desirable parts of the reduction program. Physicians are not unanimous in approving the use of thyroid extracts or stimulating drugs such as amphetamine. Most physicians do agree that the patient's attitude should not be diverted from the diet as the fundamental basis for treatment.

S. R. TOWNSEND

Postarsenical Encephalopathy in the Treatment of Syphilis in Women. Kasdon, S. C. and Shapiro, M. W.: *New England J. Med.*, **238**: 282, 1948.

At least 60% of adults under arsenical antisyphilitic therapy who develop postarsenical encephalopathy are pregnant women. It has been stated that "a pregnant woman is more susceptible to the deleterious as well as the beneficial effects of modern arsenical therapy". Among explanations of this which have been offered, is the demonstration that there is a relatively great storage of arsenic in the placenta, whence it is gradually set free in the blood, producing an increased circulating amount. Typical lesions have been observed in cases in which no arsenic has been administered, but the overwhelming number have followed the use of pentavalent arsenic, and an unusually high frequency has been noted following sulpharsphenamine. It is nevertheless to be noted that the two fatal cases described by the authors had received only trivalent arsenic—neoarsphenamine and mapharsen. Preliminary treatment with heavy metals has no effect in preventing encephalopathy in pregnancy. In the cases described, the first received 6 weeks' preparation with bismuth and in the second, a late and non-pregnant patient, mapharsen in moderate dosage was alternated with bismuth. The authors discourage the popular idea that pregnant women are especially tolerant of arsenical therapy, advocate minimal dosage of arsenicals and consider that penicillin is unquestionably the drug of choice. Although BAL was not employed by them the authors conclude from the literature that it promises to be of the greatest value in such complications of arsenical therapy, and advise a high-protein, high-carbohydrate and low-fat diet as well.

D. E. H. CLEVELAND

Sarcoidosis. I. Results of Treatment with Varying Amounts of Calciferol and Dihydrotachysterol. Curtis, A. C., Taylor, H. and Grekin, R. H.: *J. Invest. Dermatol.*, **9**: 131, 1947.

Epithelioid cells are common to the lesions of both lupus vulgaris and sarcoidosis, and in the latter are often the only abnormal cells found. Investigations appear to have shown a relationship between these cells and phospholipids, and that the characteristic tissue reactions of tuberculosis are foreign-body reactions to phospholipids. From this it is suggested that the effects obtained in lupus vulgaris with calciferol might be due to the effect of the vitamin D₂ on phosphorus of the phospholipid producing epithelioid cells rather than on increased calcium absorption or excretion. It follows on this assumption that calciferol should also be beneficial in sarcoidosis. Dihydrotachysterol causes less calcium absorption and more calcium excretion than does calciferol, therefore it was considered that it should be equally effective if not more so than calciferol. For this reason of 5 cases treated one was treated with dihydrotachysterol and 4 with calciferol. They included sarcoidosis involving skin, subcutaneous tissues, bone, glands, lungs, central nervous system and eyes. Improvement was noted in all cases, in that treated with dihydrotachysterol as well as those with calciferol. It was considered that the beneficial effect was due to the increase of phosphorus excretion, and the addition of calcium in therapy should not be necessary.

D. E. H. CLEVELAND

Some Clinical Aspects of the Normal Electroencephalogram in Epilepsy. Abbott, J. A. and Schwab, R. S.: *New England J. Med.*, **238**: 457, 1948.

A comparison between epileptic patients showing at least one normal electroencephalogram between seizures with those showing only abnormal tracings demonstrates that the former group has a definitely better prognosis. The onset is later, spells are less varied and less frequent, there is better response to medication, spells occur more frequently during sleep, remissions are more common while off medicine and there is a greater ability to work.

NORMAN S. SKINNER

Spontaneous Pneumothorax. Myerson, R. M.: *New England J. Med.*, **238**: 461, 1948.

One hundred cases of spontaneous pneumothorax were admitted to the Boston City Hospital between 1934 and 1943 (0.027% of total admissions). In 64 underlying pulmonary disease was present while 36 cases occurred in apparently healthy individuals. A history of unusual physical exertion prior to onset was obtained in 20%. In the 64 patients with underlying pulmonary disease 38 had tuberculosis, 5 emphysema, 5 bronchiectasis, 4 postpneumonic empyema, 3 asthma, 3 lung abscess, 2 metastatic carcinoma, 2 pneumonia and there were single cases of bronchogenic carcinoma and pulmonary infarct. Recurrences occurred in three of the apparently healthy group (14.3%). Only one of this group subsequently developed tuberculosis. Spontaneous pneumothorax, in the absence of underlying pulmonary disease, has an excellent prognosis.

NORMAN S. SKINNER

Thoracic Tenderness in Pulmonary Infarction. Godfrey, J.: *New England J. Med.*, **238**: 86, 1948.

The correct diagnosis of pulmonary infarction is important in order to institute prompt treatment (such as venous ligation) to prevent a second, and perhaps fatal, pulmonary embolus. Small infarcts are difficult to diagnose since chest signs are usually absent and x-ray findings late in appearing. Five case reports are presented demonstrating the importance of localized tenderness of the chest wall as an early sign of the presence of a small pulmonary infarct.

NORMAN S. SKINNER

Surgery

New Test in Diagnosis and Surgical Treatment of Varicose Veins. Slevin, J. G.: *Am. J. Surg.*, **75**: 469, 1948.

The treatment of varicose veins by saphenofemoral resection and injection of sclerosing solutions is insufficient. Incompetent communicating veins have not been sufficiently recognized. The multiple tourniquet test is done with three constricting bands above the knee and at least one below the knee. The patient then stands and the tourniquets are removed from below upward. A filling of varices before the highest tourniquet is removed shows the presence of a "blow-out". The location of the communicating vein can be defined by repetitions of the test. There are frequently three or four such "blow-outs" in one extremity. Two hundred cases treated by this method are described. In only 2.5% of the series was the lesser saphenous vein involved. Retrograde injections have been abandoned because of the danger of deep thrombosis and embolism, the necessity of abandoning ambulation frequently, and its frequent failure. The avoiding of putting the patient to bed is stressed.

Cotton is preferred to catgut, silk or nylon because it causes least reaction. Sodium morrhuate is preferred for sclerosis, and soricin is used when the patient is sensitive to morrhuate. Less solution is needed if elastic bandages are used after injections.

BURNS PLEWES

Pulmonary Resection for Abscess of the Lung. Glover, R. P. and Clagett, O. T.: *Surg., Gyn. & Obst.*, **86**: 385, 1948.

In a plea for earlier surgical intervention and the replacement of drainage by resection in the treatment of lung abscess, 37 cases are reviewed. Chronic lung abscess treated by lobectomy shows a much lower mortality rate. If the surgeon sees the acute abscesses early, before complications such as fibrosis, bronchiectasis and atelectasis occur, open drainage may be successful, but occasionally resection for parenchymal scarring will be necessary later.

Resection should be done when symptoms persist due to secondary changes after open drainage, for multiple abscesses, for abscesses with bronchiectasis, etc., where the diagnosis of malignancy is entertained, when excessive bleeding occurs, in children and when abscesses are secondary to unremovable bodies. Though these patients are wasted and in poor condition, conservative resection resulted in a mortality of less than 5%.

BURNS PLEWES

Use of Autogenous Grafts for the Repair of Large Gaps in Peripheral Nerves. Seddon, H. J.: *Brit. J. Surg.*, **35**: 151, 1947.

Closure of gaps in peripheral nerves after resection back to healthy bundles is a standard method of peripheral nerve repair. But gaps longer than 11 cm. in the lateral popliteal or 9 cm. in the case of the median nerve cannot be recovered from in this way, for the postoperative stretching no matter how carefully done, precludes success. In a series of 700 cases the gap was too great in 19.5%. Heterogeneous nerve-grafting has been an unqualified failure. Formol-fixed homografts are unsound and disappointing. Autogenous grafting has been successful in animals.

Fifty-two cases of autogenous nerve-grafting are reported. In 38% recovery was as good as in the best end-to-end suture. In a further 30% the results were encouraging. The best grafts are those taken from the medial cutaneous nerve of the forearm, the sural, the superficial radial and the saphenous. The graft should be 15% longer than the gap, for all shrink, and the diameter should be at least equal to that of the peripheral stump. Inlay grafting is the ideal treatment for partial division of a nerve. Cutaneous grafts, whether single or in the form of a cable, are best attached with concentrated fibrinogen.

BURNS PLEWES

Survey of Some Aspects of Appendicitis. McCullough, J. Y.: *Am. J. Surg.*, **75**: 453, 1948.

If the mortality of appendicitis is to be reduced toward zero, the earliest signs and symptoms of the disease must be appreciated. When the lumen is obstructed, the signs are more acute, but appendicitis may not send the patient to a doctor till general peritonitis has developed. Pelvic perforation is the most easily overlooked and is therefore the most dangerous. A finger in the rectum is more important than a thermometer in the mouth. Pelvic appendicitis is more apt to be complicated by intestinal obstruction.

Treatment is still surgical, but advances have been made. Restoration of fluid and electrolyte balance, correction of hypoproteinemia by amino-acids, have lessened mortality. Large doses of penicillin for peritonitis due to Gram-negative organisms has halved the mortality on one service. The Miller-Abbott tube has been of great value in paralytic and mechanical ileus.

BURNS PLEWES

Obstetrics and Gynæcology

Intrauterine Rupture of the Umbilical Cord. Baneroft-Livingston, G.: *Brit. M. J.*, **1**: 449, 1948.

Two cases of intrauterine rupture of the umbilical cord are presented. In Case 1 the infant was normal, and rapid delivery after the nature of the accident was realized ensured a live birth. Blood loss was subsequently repaired by transfusion. Case 2 is an example of short cord associated with gross fetal abnormality, the more common finding. Neither of these cases was diagnosed early enough for any alternative line of treatment to be considered. The diagnosis is considered, and the conclusion is reached that the condition is rarely suspected before the cervix has dilated fully and the head has failed to advance. The umbilical cord is unlikely to withstand traction with obstetric forceps, but as illustrated by Case 1, provided the nature of the accident is realized the danger to the fetus can be minimized by rapid delivery. Inversion of the uterus must be a very rare accident, and there are few records of placental avulsion due to short cord.

ROSS MITCHELL

Plasma Proteins in Pregnancy. Macarthur, J. L.: *Am. J. Obst. & Gyn.*, **55**: 382, 1948.

The copper sulfate method for measuring the specific gravity of the blood serum or plasma gives satisfactory and clinically accurate estimations of plasma protein concentrations. It is simple, quick and may readily be carried out as an office procedure. Combined hematocrit and plasma protein estimations give more information than the plasma proteins alone. The hypoproteinemia of normal pregnancy is relative to plasma dilution. Over short periods of time, feeding of hydrolyzed protein by mouth or vein produces no elevation of plasma proteins, or improvement in the clinical condition of patients with toxæmia of pregnancy. The hypoproteinemia of pre-eclampsia and eclampsia is very likely due to failure of albumin synthesis by a damaged liver. The essential amino-acid, methionine, may by its protective action upon the liver, materially aid in the prevention and treatment of toxæmias of pregnancy. Further experience with its use is necessary.

ROSS MITCHELL

A Study of Breech Delivery. Trites, A. E.: *Am. J. Obst. & Gyn.*, **55**: 430, 1948.

Belief is expressed that a more favourable fetal mortality rate than generally quoted is possible, based upon the following considerations. (1) A complete study of the maternal pelvis by clinical and radiologic methods with delivery by Cæsarean section if the pelvis is contracted. (2) A conduct of labour designed to achieve a high incidence of spontaneous delivery of the breech with interference only on definite indication. (3) Constant personal supervision of the second stage of labour

by the attending obstetrician. (4) The utilization of local anaesthesia, wide episiotomy and frequent application of aftercoming head forceps in delivery.

ROSS MITCHELL

Cerebral Haemorrhage Occurring Early in Pregnancy.

Lerer, S.: *J. Obst. & Gyn. Brit. Emp.*, **54**: 659, 1947.

Congenital aneurysm, syphilis vascular disease, blood dyscrasias, particularly haemophilia and leukaemia, and diabetes are contributory causes of cerebral haemorrhage of pregnant or non-pregnant women. Irish (1939) in a study of 1,000 postmortem examinations of cases of vascular encephalopathy, found cerebral vascular involvement in young subjects in 40 cases. Embolus appeared in 10 cases, thrombus in 6 cases, and haemorrhagic lesions were present in 24 patients under twenty years of age. He mentions that spontaneous cerebral haemorrhage has been found frequently occurring in young people without apparent cause, but careful investigation in some instances has disclosed a small heart and vascular hyperplasia in the cerebral vessels, the so-called "thymic syndrome".

P. J. KEARNS

Histaminolytic Index of Blood During Pregnancy and its Clinical Application. Anrep, G. V., Barsoum, G. S. and Ibrahim, A.: *J. Obst. & Gyn. Brit. Emp.*, **54**: 619, 1947.

The histaminolytic power of the serum, in cases of imminent abortion or miscarriage resulting from trauma or other accidental injury, is considerably reduced as compared with that expected for the given month of pregnancy. The extent of this diminution, in blood samples collected 18 to 36 hours after beginning of the uterine bleeding, ranged between 54 and 100% with an average for 26 cases of 78%. In suspected intrauterine death of the fetus the histaminase reaction is useful as an aid in the prognosis of the outcome of the case. A diminution of the histaminolytic index to about a half or less than that expected for the month of pregnancy indicates such a considerable disturbance of the placental circulation as to render the normal continuation of pregnancy unlikely. Especially unfavourable are those cases in which the power of the serum to inactivate histamine progressively diminishes in the course of a few days or even hours. A diminution of the index by less than 40% of the expected results, especially when it shows a tendency to increase in the course of a few days, is in favour of a good prognosis.

P. J. KEARNS

Icterus in Pregnancy: A Clinico-Pathological Study Including Liver-Biopsy. Nixon, W. C. W., Egeli, E. S., Laqueur, W. and Yahya, O.: *J. Obst. & Gyn. Brit. Emp.*, **54**: 642, 1947.

Cases of icterus in pregnancy have been investigated and the findings of liver-biopsies described. Examination of liver-biopsy material reveals two types of jaundice, the one etiologically related to the state of pregnancy without striking histological changes (jaundice of pregnancy), the other representing the condition of infective hepatitis (concomitant jaundice). In the absence of liver-biopsy, serum-protein estimation is a valuable aid. When in jaundice of short duration an inversion of the albumin/globulin ratio is found, then "jaundice of pregnancy" is to be suspected. Whether infective jaundice will proceed to acute yellow atrophy depends on the nutrition of the mother.

P. J. KEARNS

Diagnostic and Therapeutic Aspects of Kymographic Uterotubal Insufflation with Comparative Observations on Hysterosalpingography. Rubin, L. C.: *J. Obst. & Gyn. Brit. Emp.*, **54**: 733, 1947.

We are here to consider the merits of uterotubal insufflation and hysterosalpinography. For the diagnosis of tubal patency and non-patency the former has proved the method of choice. For the diagnosis of intrauterine disease both in sterility and in general

gynaecology hystero-graphy *per se* is invaluable. Its only competition is uteroscopy which should perhaps be adopted more generally by gynaecologists. From the therapeutic side uterotubal insufflation aids the sterile woman who has partial tubal obstruction. The results exceed those of hysterosalpinography on the one hand and of surgical plastic procedures on the other. When other therapeutic, physical and hormonal adjuvants are added to uterotubal insufflation the salvage may be appreciably improved.

P. J. KEARNS

Incubation Period of Ophthalmia Neonatorum. Sorsby, A.: *J. Obst. & Gyn. Brit. Emp.*, **54**: 842, 1947.

A consecutive series of 290 cases of ophthalmia neonatorum is recorded. Of this total 84.5% occurred within the first 10 days of life; there were rather fewer in the first 5 days of life than in the second. The incubation period varied with the exciting organism. With the gonococcus some 70% were observed in the first 5 days of life, with diphtheroids some 50% and with *S. aureus* some 37% whilst with the virus of inclusion blennorrhoea there were only occasional cases in the first 5 days of life. As to severity, cases of moderate severity predominated in the series as a whole, but the gonococcal infections severe cases were as common; severe cases were infrequent with *S. aureus*. There was nothing to suggest that in an unselected series severe cases are substantially less frequent in the second 5 days of life than in the first.

P. J. KEARNS

Neurology

Guillain-Barré Syndrome. Dempsey, W. S. Karnosh, L. J. and Gardner, W. J.: *Dis. Nerv. System*, **9**: 67, 1948.

The names given this condition have been many, however, inasmuch as the etiology is unknown, the title Guillain-Barré syndrome seems to be an apt one. The syndrome is characterized by polyneuritis often with facial diplegia. It usually presents albumino-cytologic dissociation of the cerebrospinal fluid with favourable prognosis in the majority of cases. The syndrome is seen both as a primary condition and in association with diabetes, syphilis, diphtheria, serum-sickness, fever therapy, pregnancy, exposure to mustard gas and other conditions. The precise nature is obscure both in its primary and associated form. No recognized factors in any case of diphtheria, diabetes, syphilis and the like precede or prognosticate the development of the syndrome.

PRESTON ROBB

Anæsthesia

The Influence of Posture on Mechanics of Respiration and Vital Capacity. Stephen, C. R.: *Anæsthesiology*, **9**: 134, 1948.

This study of the influence of posture on the mechanics of respiration and the vital capacity was conducted on 19 normal adult patients of both sexes, ranging in age from 20 to 62 years, at the Montreal Neurological Institute. By means of a Benedict-Roth basal metabolism machine it was easy to calculate the vital capacity in the various postures adopted. Seven different postures on the operating table were tested as to their effect upon the patient's vital capacity. (1) Supine, with pillow under head and pillow under knees. (2) Trendelenburg, 35°. (3) Reverse Trendelenburg, 35°. (4) Prone, abdominal brake up, without chest supports. (5) Prone, abdominal brake up, with chest supports. (6) Prone, table flat, with chest supports. (7) Upright, with elevation of lower extremities.

It was found that it was in the prone position, when the brake was up and the subject without benefit of chest support, that the most marked decrease in vital capacity was noted. With the exchange of a patient in the normal supine posture taken as 100%, the position

of brake up, prone without chest support, showed an average reduction of vital capacity to 72.9% of the normal. On the other hand it was found that a patient in the sitting or erect position with the knees flexed so that the lower extremities were elevated to approximately the cardiac level, showed the increased vital capacity represented by 101.3% in an average of all the cases as compared with 100% for the supine position. This position was obtained by means of a special table and was devised by Dr. W. V. Cone for certain intracranial and cervical procedures. This approached the highest vital capacity value which was afforded by the reverse Trendelenburg position and represented 107.4% of the normal figure for the supine (100%).

The sitting position caused a tendency for an interference in circulatory efficiency in deeper stages of anaesthesia and associated relaxation. It was in an effort to compensate for this effect of gravity on the circulation that the lower extremities were raised to approximately the cardiac level. Vital capacities in this posture compared favourably with those recorded in the supine position and the flexion of the thighs on the lower part of the abdomen did not interfere mechanically with the downward and forward movement of the diaphragm.

F. ARTHUR H. WILKINSON

Dermatology

The Newer Concept of Allergy to Drugs and Bacteria.
Lowell, F. C.: *J. Am. M. Ass.*, 136: 665, 1948.

Ordinary methods of investigating immunologic problems do not seem to apply to the majority of drugs and bacterial allergens, as circulating antibody appears to be absent, or if present is unrelated to the hypersensitive state. Passive transfer of the contact or tuberculin type of sensitivity cannot be achieved by injecting serum from an allergic animal into a normal one. Injection of a peritoneal exudate rich in leucocytes from a sensitive animal into the abdominal cavity of a normal animal may produce a transient passive sensitization, giving evidence that the sensitizing ability resides in the cell. Allergic reactions may be grouped in 3 main categories according to the rôle of antibody. The usual immunologic techniques demonstrate *in vitro* that in one group the reaction depends upon a thermostable antibody, and *in vivo* anaphylaxis, the Arthus phenomenon, the immediate type of cutaneous reaction and passive sensitizing capabilities appear. This type of antibody is used for passive and active immunization procedures. Few allergic diseases depend upon this type, and include erythroblastosis fetalis, certain transfusion reactions and serum disease. In a large group dependent upon a thermolabile antibody which has not been demonstrated *in vitro* but in which prolonged passive sensitization is produced, especially in the skin, the reactions of "atopic" subjects are an example, but this antibody is rarely concerned in drug and bacterial allergy. The largest group is characterized by the absence of demonstrable antibody in the circulating blood, and includes most drug and infection allergies. Injection of the allergen may produce the tuberculin type of reaction and it is shown superficially in the patch test. In many instances of drug allergy however no local reaction can be produced and the reaction, usually systemic, appears only when the drug is absorbed into the circulation.

The significance of the rôle of the cell appears in that the great majority of supposedly allergic diseases are associated with damage to or destruction of cells. The conditions under which exposure to a drug or other allergen occurs are also of great significance. Thus allergic reactions to the sulfonamides are most frequent and severe when they have been applied to eczematized areas of skin. In connection with bacterial allergy the question is raised as to the rôle of bacteria or their products in enhancing the development of hypersensitivity to an antigen injected with them. The belief that glomerulonephritis is an allergic reaction to streptococcus, in view of its experimental production in kidney-

sensitized animals, may find its true explanation in the assumption that antibodies to kidney have been developed as the result of a streptococcus infection without the necessity of invoking an allergy to streptococcus.

D. E. H. CLEVELAND

Toxicity of α -Benzene Hexachloride in Clothing.

Horton, R. G., Karel, L. and Chadwick, L. E.: *Science*, 107: 246, 1948.

Gamma-benzene hexachloride is a very effective insecticide and miticide and is manufactured under a trade name, gammexane. Clothing impregnated with it withstands repeated launderings better than with any other substance so used. The possibility of its being absorbed through the skin and producing toxic effects has been investigated. Animals which had been close clipped were exposed by wearing impregnated cloth coverings arranged to be worn as garments under conditions which excluded the possibility of the substance entering the body through gastro-intestinal or respiratory routes. The covered area per unit body weight approximated that of a man wearing a suit. Weakness, flaccid paralysis, final periodic convulsions, generally terminating in death, resulted. Unless it can be shown that man is markedly more resistant than the experimental animals used it is probable that this insecticide can be used safely to impregnate clothing only in such low concentrations as to eliminate its usefulness for the purpose for which it was intended. D. E. H. CLEVELAND

Industrial Medicine

Health Examinations of Industrial Executives—A

Panel Discussion. Reported by DeJongh, E.: *Indust. Med.*, 17: 70, 1948.

This article is a report of a panel discussion which took place at the General Motors Corporation Medical Conference on November 14, 1947, when representatives of eight different clinics met to consider the statistical findings furnished by their diagnostic health examination program for executive employees. A statistical analysis of these prepared by one of the medical consultants formed the basis for the discussion. This did not violate the confidential nature of the program as diagnoses only were given and could not be identified with any person examined. The different discussants drew attention to various observations made at the clinic which they represented. At one it had been noted that 35% of cases analyzed had emotional strain at work and 14% emotional strain or tension at home. Certain individuals are under strain no matter what their jobs is. Obesity was a very important ailment of the age group undergoing these examinations. Associated with this in many cases was cardiovascular disease; at one clinic 25% of the executives examined showed cardiovascular disease.

The question of the history and the examination itself came under review. In this, considerable difference of opinion was presented. In general it was felt that the history might be of the "dragnet" type; i.e., one in which all the questions might be asked regardless of whether or not the answer to some questions eliminated others. The examination however, should be on an individual basis, not a "dragnet" type, except in those cases where any specific abnormality is uncovered. When this occurs all the diagnostic facilities available should be used. It was pointed out by one discussant that the trend of the times in medicine was individualized attention divided toward functional evaluation of the patient as a whole rather than a conglomeration of organs that may not be working well. It was suggested by another that those individuals labouring under anxiety and fatigue who need personalized attention and continuing support throughout the year be turned over to their personal physician.

MARGARET H. WILTON

The Present Status of Industrial Medicine. Sappington, C. O.: *J. Am. M. Ass.*, 135: 811, 1947.

Although American industry has made great progress, until today it occupies the top position among the nations in production and production methods, American industrial medicine has not achieved the same recognition and has no real place among other medical specialties. In this article the author gives a brief consideration of the present status of industrial medicine and calls attention to certain factors in the past which have led to its position. The critical attitude of other specialists and practitioners in general, together with the fact that in many instances industrial medicine has not been well understood, has retarded its growth. The remuneration offered to physicians in industry has been and is still, in many instances, insufficient to attract good men. Many of the leaders in industrial medicine have been motivated by idealism, not by money. Other factors retarding its maturity as a specialty, have been the slow recognition on the part of legislators of the importance of preventive principles, and the slow recognition on the part of medical schools, of the importance of providing undergraduate and postgraduate courses in industrial medicine.

It is the author's opinion that industrial medicine today needs an industrial relations survey within its own ranks, a good public relations program to inform industry continuously as to the nature and extent of health services which should be provided, and a psychosomatic diagnosis within its own domain, followed by appropriate advice and treatment. He feels that certain recent trends give promise of the significant rôle of industrial medicine in the future.

MARGARET H. WILTON

OBITUARIES

Dr. William A. Atkinson, of Edmonton, died recently in Florida. Born at Guthrie, Ont., he attended collegiate and model school at Barrie. After teaching for several years, he entered Toronto Medical College, from which he graduated in 1904.

Dr. J. F. V. Chester, aged 50, of Toronto, died of a heart attack May 16, at Hunstville, Ont. Dr. Chester had practised medicine in Toronto the past 23 years. Born in Port Sydney, he attended Jarvis Collegiate Institute. He graduated in medicine from the University of Toronto. During the first great war, he served as surgeon in the Royal Navy in the Mediterranean. He was attached to the staffs of St. Michael's and Toronto East General Hospitals. He was a member of Kingston Road United Church.

He is survived by his widow, two daughters, a brother and sister.

Dr. Vincent P. Doucet died at his home in Moncton, N.B., on May 13. He was 46 years of age.

Born in Richibucto in 1902, he received his early education there and later entered St. Joseph's University, graduating in 1922 with a Bachelor of Arts degree. He then entered the medical school of Laval University, Quebec City, and graduated in 1927 with an M.D. He practised in Richibucto for a year and then went abroad for postgraduate study in Paris, Vienna, Germany and New York. He opened a practice in Moncton in 1931 and had resided in the city ever since. He was a member of L'Assomption Society and of the Moncton Curlers Association. He was widely known and esteemed by a wide circle of friends who will mourn his death. Surviving are his widow, two daughters, one son, three sisters and one brother.

Dr. William Rathburn Sutherland Groves died suddenly in Vancouver on May 6. He is survived by his widow.

Dr. E. A. E. Howard died on June 1 at the Toronto General Hospital. He was born at Hagersville, Ont. He was a graduate in medicine from the University of Toronto in 1906. He was a member of the Granite Club and various medical associations. Dr. Howard is survived by two sisters.

Dr. Armand Landry, aged 39, was drowned on May 12 in the Red River near St. Adolphe where he had been practising. The recent floods along the river with the need for inoculating the residents against typhoid had thrown a heavy strain on him. He received his B.A. degree in 1928 as a student in St. Boniface College, and in 1934 his M.D. degree from Laval University. He is survived by his mother and two sisters.

Dr. R. H. McCutcheon died on April 25 in Vancouver. He was 67. Surviving are three sons, two grandsons, a brother, and a sister.

Dr. Simon Joseph McNally, of Campbell's Bay, Que., died at his home there on May 8 at the age of 82. He was born on Calumet Island and had practised medicine in Campbell's Bay and district since 1895. He graduated in medicine from Laval University in 1893. For many years he was president of the Pontiac Conservative Association and although never elected had stood as candidate on three different occasions. In municipal politics he served more than 25 years as mayor or councillor and also served more than a quarter century on the school board. He is survived by his widow, one brother and several nieces and nephews.

Dr. Thomas R. Ponton died at Redlands, California, on April 2. He was in his 74th year. He was born in Manitoba and was graduated from the University of Manitoba, practising for some years at Portage la Prairie. During World War I, he served in the C.A.M.C. in England and in France. On his return he became first assistant to Dr. Malcolm MacEachern at the Vancouver General Hospital, replacing Dr. MacEachern's former assistant who had died during the influenza epidemic. Later he served with the American College of Surgeons. He did a great deal of consulting work both on this continent and in South America and, on many occasions, took over the administration of weak hospitals and built them up. Dr. Ponton was always deeply interested in nomenclature and developed the alphabetical nomenclature, frequently known as the Ponton system, and which was later replaced by the Standard Nomenclature of Diseases and Operations. In 1939 he published the well-known book *Medical Staff in the Hospital*. In later years, he was editor of *Hospital Management* and at the time of his death was carrying out his portion of the responsibility of publishing that magazine from his ranch home at Yucaipa in California.

Dr. J. S. Rivers, aged 79, died in Vancouver on April 21 following a lengthy illness. Born in Sarnia, Ont., he was a graduate of the University of Toronto medical college in 1896. He practised medicine in Ontario until 1902 when he came west and started a practice in Raymond, Alberta. He also was a member of the Masonic Order and of the I.O.O.F. Besides his widow, he leaves two sons.

Dr. Jordan W. Smith, a native of Selma, Hants County, died in Liverpool, N.S. on May 6 in his 84th year after a brief illness. He was well-known throughout the province, both as an outstanding physician and as a member of the Nova Scotia Legislature.

Previous to his medical career, Dr. Smith was a school teacher. He graduated from the College of Physicians and Surgeons at Baltimore, Md. in 1891 and from the New York Post Graduate School and Hospital in 1906, later practising in Baltimore before returning to his native province.

He is survived by one daughter and four sons.

Dr. Herbert Tatley died on May 16 at his home in Montreal after a lengthy illness. He was 80 years of age. He was one of the founders of the Grace Dart Hospital for tuberculosis and devoted most of his life to it.

In March, 1943, Dr. Tatley was honoured by the directors of the hospital at a dinner in celebration of his 50 years' connection with it. Born in England, Herbert Tatley came to Canada at the age of eight. He was educated at Bishop's College, and studied for his medical degree in Edinburgh University. After receiving it, he returned to Canada and served his internship at the Montreal General Hospital.

In his younger days, Dr. Tatley was a great athlete. He was a big game hunter and until a few years ago used to go north every fall to hunt moose. He was also an enthusiastic fisherman and a golfer. He is survived by his widow, two daughters and one son.

NEWS ITEMS

Alberta

The Aberhart Memorial Hospital (for tuberculosis) is to be built on the south-west section of the University of Alberta grounds. The ground work is under-way and this 250 bed hospital will be a fine addition to the now rapidly growing University of Alberta.

Drs. F. H. H. Mewburn and Graham Huckell attended the orthopaedic convention held at the Hotel Frontenac in Quebec City recently.

The Refresher Course arranged by the Medical Faculty of the University of Alberta was well attended this year and many fine cases and papers presented. Dr. Roy Huggard of Vancouver, Dr. Lennox Bell of Winnipeg and Dr. S. Banks of Chicago were the outside speakers.

The new wing and annex of the Royal Alexandra Hospital in Edmonton have been completed. These additions are a great asset to this city-owned institution.

The various medical and surgical reporting clubs, of which there are ten in Edmonton, are bringing their meetings to a close for the summer season; similar clubs in Calgary are doing likewise and will commence again in the fall. At these clubs whose membership varies from ten to fifteen the various medical journals are reviewed and discussed.

W. C. WHITESIDE

British Columbia

The disastrous flooding of the Fraser River during the last days of May, and still continuing, is presenting very serious problems to the public health authorities. The inhabitants of the areas affected, great farming lands and small towns, depend largely upon wells for drinking water, and use outdoor toilets. The great danger is of pollution, to a serious and lasting degree, of drinking water. Great numbers of cows are un milked, and the health authorities fear serious infection of these cattle. The milk situation may become critical at any time; but up to date is under control.

The isolation of Vancouver and the coast cities by rail has led to a very serious shortage of butter—in fact, at the time of writing, it is almost unobtainable.

The health authorities of Victoria have taken charge most effectively in this situation, and are providing emergency hospitals, sanitary inspection and control, and are busy day and night. A complete 25-bed hospital was sent from Victoria to Vancouver, to act as a nucleus for emergency hospital care.

The Annual Summer School of the Vancouver Medical Association is in full swing, and an excellent program has been provided. The speakers are all men of high calibre as lecturers and teachers, and the attendance is good, though undoubtedly the difficulties of transportation caused by the flood, will limit this to some degree.

The cities of North and West Vancouver are at present negotiating with each other, with a view to the formation of a North Shore Board of Health, and progress is being made in this direction. The ultimate union of this body with the Metropolitan Health Board of Vancouver and adjacent municipalities, is hoped for.

Two of the latest designs in oxygen tents have been presented to the Kelowna General Hospital by the Kelowna Lions Club. The gift is appreciated very greatly by the hospital, which expressed its thanks to the Lions Club at a brief formal ceremony, when the gift was made.

The Duncan Hospital has notified the Department of Indian Affairs that it will not accept Indian patients in future, except in emergency, unless the Department will pay the usual hospital rates. This the Department has so far refused to do. Since the Workmen's Compensation Board and the Blue Cross are both willing to pay the prevailing rates, it is difficult to see why the D.I.A. should have any special preference. Hon. G. S. Pearson, B.C. Minister of Health, has notified the hospital that it is justified in its action.

The 30th Annual Meeting of the Canadian Public Health Association was held in Vancouver May 13 to 20, and was an outstanding success—under the chairmanship of Dr. G. F. Amyot, Deputy Minister of Health of B.C.

Dr. James M. Hershey, Assistant Provincial Health officer, has been named commissioner in charge of administering the new compulsory hospital insurance plan of B.C.

J. H. MACDERMOT

Manitoba

Winnipeg has welcomed in May distinguished visitors from distant lands. On May 6 Dr. Cotter Harvey, Honorary Medical Officers to Royal Prince Alfred and Royal North Shore Hospitals, Sidney, N.S.W., inspected the Central Tuberculosis Clinic and was present at a meeting of the Medical Advisory Committee. On May 21, Dr. Harley Williams, Secretary-General of the National Association for the Prevention of Tuberculosis, London, Eng., sat in at a meeting of the Sanatorium Board and addressed the members on the world situation with regard to tuberculosis. Sir William Fletcher Shaw, LL.D., first Secretary of the Royal College of Obstetricians and Gynaecologists, was the guest of honour at a dinner in Manitoba Club on May 25. The dinner was arranged and presided over by Professor F. G. McGuinness and Dean A. T. Mathers, and twenty of the obstetricians and gynaecologists of the city were present.

A fund is being raised to establish in the Winnipeg General Hospital a memorial to the late Dr. George F. Stephens, who from 1919 to 1940 was superintendent of that institution. Subscriptions should be sent to Dr. Harry Coppinger, Superintendent of the Winnipeg General Hospital.

A vigorous campaign is being waged to raise fund of \$1,500,000 for the erection and equipment of a new Children's Hospital in Winnipeg. The present building on Aberdeen Ave. is quite inadequate. The new hospital will be built on Notre Dame Ave. in the Manitoba Medical Centre near the Winnipeg General Hospital and the Medical College.

Premier Garson has stated that Manitoba will match dollar for dollar the appropriation of Dominion funds for the provision of additional hospital beds in the province.

Dr. E. W. Montgomery has been elected Chairman of the Board of Health.

At the beginning of May the Red and Assiniboine Rivers reached very high levels. St. Boniface Hospital and the Municipal hospitals, King George and King Edward, were threatened but dykes were built in time to prevent flooding. Several doctors were forced to evacuate their homes on the banks of the Red River.

Plum Coulee and the adjacent district celebrated on June 3 the fiftieth year of Dr. Hugh McGavin's practice there. The program included a march past of nearly 3,000 school children of the district. A half-holiday was declared in Dr. McGavin's honour. Not only has he practised there since his graduation, but he represented the Rhineland constituency from 1928-1932.

ROSS MITCHELL

New Brunswick

Dr. E. G. Bourque has resigned his position as medical officer to Dorchester Penitentiary, which he held from 1935, with the exception of his period of service in the R.C.A.M.C., in World War II. Dr. Bourque intends to do private practice at Shediac, N.B.

Dr. C. R. Baxter, Medical Officer of Canadian National Railways, received "the official vote of thanks" from Viscount Alexander, for devoted service in promotion of first aid in the Maritimes. Dr. Baxter has long practised in Moncton.

Under legislation passed by the present session of the N.B. Legislature, Silicosis is now classed as an industrial disease by the Workmen's Compensation Board and they have authorized the necessary medical measures for examination and compensation as well as advising safeguards in dangerous trades.

The New Brunswick Department of Health has announced that henceforth it will pay the full per diem cost of treatment for all tuberculosis cases treated at the Saint John Tuberculosis Hospital. This institution is owned by the municipality of the city and county of Saint John. The new rate of payment includes such items as depreciation, loan interest and pension plan payments.

At the annual meeting of the Saint John Medical Society at the Admiral Beatty Hotel, the new officers for 1948-49 were elected as follows: *President*—Dr. Geo. White; *Vice-President*—Dr. R. A. Gregory; *Secretary*—Dr. T. E. Grant; *Treasurer*—Dr. Frank Stuart; *Executive*—Dr. R. T. Hayes, Dr. John Finley and Dr. V. D. Davidson.

The executive committee of the N.B. Medical Society met recently in Saint John and dealt with routine Society business. They also forwarded plans for the Annual Meeting of the Society to be held at Bathurst, September 7 and 8.

Brigadier W. L. Coke, D.G.M.S., addressed an informal meeting of Reserve Army Medical Officers at the Admiral Beatty Hotel, Saint John, during his inspection tour of Eastern Canada, recently. Discussion included newer ideas of defence against atomic weapons.

A. STANLEY KIRKLAND

Nova Scotia

The American College of Surgeons held a sectional meeting in Halifax on May 17 and 18. While the number attending was not as large as anticipated due to threatened rail strikes, over three hundred registered. A Hospital Section was conducted as well as the Surgical Section. A number of sessions at the new Victoria General Hospital, introduced the gathering to what Dr. M. T. MacEachern termed the finest teaching hospital in the British Empire. In accord with its custom of informing the general public of progress in the cure of disease and injury, a large public meeting was the last feature on the program.

The new Victoria General Hospital was officially opened on Victoria Day, May 24, the sixty-first anniversary of its career under that title. Beginning as the Halifax City Hospital in 1857, it became the City and Provincial Hospital ten years later. Twenty years later still following an investigation into its affairs it was taken over wholly by the Province, and in honour of Queen Victoria's Golden Jubilee was given her name. It is the only provincially operated general hospital in Canada. When renovation of older units is complete it will have a capacity of 600 beds. Its equipment is the most up-to-date procurable.

Dr. W. W. Patton of Glace Bay, seriously ill for several weeks last winter is greatly improved and looks forward to carrying on some of his practice at least, later in the year. Dr. Fraser Nicholson who has been associated with him for several years plans to leave soon for an extended period of postgraduate work.

Thirty-four graduates from Dalhousie University Medical School this year will swell the ranks of the profession. Several will remain in the Maritime Provinces and Newfoundland to do general practice, and others will continue their studies in hospitals in the same area.

There is need of a new general hospital in Pictou County and the matter has been diligently explored for some time. The present Aberdeen Hospital at New Glasgow is inadequate to meet the demands for increased hospital service. Building costs have made the proposal to construct a new hospital appear beyond the financial means of the constituency. It is reported, however, that the Province has recently offered to underwrite one-third of the cost of a structure costing one and one-half million dollars. H. L. SCAMMELL

Ontario

Dr. Alan Brown had the distinguished honour of giving The Ingoldsby Lectures in Birmingham England in May. This is the first time a Canadian has been called upon to fill this engagement. Dr. Brown made the crossing both ways by airplane.

Dr. T. C. Routley marked the thirtieth anniversary of his appointment as Secretary to the Ontario Medical Association by giving a dinner to all surviving members of the Board of Directors who served during that period. Seventy of the group attended the function on May 10. Dr. Routley chose the occasion to present the association with a beautifully designed shield which is to be awarded annually to the local society showing the highest attainment during the year. M. H. V. CAMERON

Dr. Donald M. Low, Dr. J. R. McArthur, and Dr. W. A. Dafoe, all members of the Medical staff of the University of Toronto, have been awarded fellowships in the Royal College of Obstetricians and Gynecologists of England.

Wellesley Hospital, founded in 1912 as a private hospital and converted to a public institution in 1943, is to become part of the Toronto General Hospital, and the same high standard of administration, medical and nursing care which has characterized both hospitals in the past will be continued. Merging of the two hospitals will be beneficial to both, according to those close to the situation. It will place more beds under one control, permit greater flexibility, and allow financial savings through unified administration. In common with all hospitals, Wellesley has been confronted with formidable financial problems. Wellesley Hospital, situated on Homewood Place, completed a modern, six-storey addition in September, 1947. The hospital has 260 beds of which 153 are in the new wing. There are 132 student nurses attending training school and 70 graduate nurses. Chief of the medical staff is Dr. John Laing McDonald.

Wellesley was founded by Dr. Herbert Bruce. Associated with him were Sir William Mulock, Sir Mortimer Clark and Sir Edmund Osler. Until 1943 it was operated as a private hospital. In that year, after negotiations with the city, it was converted into a public hospital. The growing demand for hospital beds led the board of governors to decide on an expansion program. The new wing was started in June 1945, and completed in September last year. LILLIAN A. CHASE

Quebec

Announcement is made that the Montreal General Hospital has definitely decided to move to a new site further uptown. The hospital has occupied its present site since its foundation 127 years ago. In that time it has completely outgrown its cramped position and its lack of space is greatly impairing its usefulness. Perhaps the decisive factor is that future town planning schemes call for a widening of Dorchester Street, on which the hospital fronts, which will encroach directly on the buildings themselves.

The new site on Pine Avenue West and Côte-des-Neiges Road is not only in a very attractive position, but has more than four times as much land as the present one. The move has only been decided on after very long and careful study of the matter. It will probably be three or four years before it is fully consummated.

Le Premier Ministre de la province a offert un octroi de \$200,000 pour la construction d'un hôpital à Montmagny.

Le Dr Mercier Fauteux, Professeur aux universités McGill et de Montréal, fera une série de conférences en juin à Bruxelles, Paris et Londres sur la chirurgie du cœur.

Une des vice-présidences du IVe congrès international de neurologie qui aura lieu à Paris en septembre 1949 a été accordée aux Drs W. Penfield et Jean Saucier de Montréal.

Un nouvel octroi de \$200,000 a été voté à l'hôpital St-Eusèbe de Joliette pour agrandissement et améliorations.

Le Dr Pierre Bernard vient de recevoir du Gouvernement de la province une bourse d'études chirurgicales en France et aux Etats-Unis.

Le Dr L. Boisvert a été élu président de l'Association des médecins de langue française des Cantons de l'Est.

Un octroi de \$320,000 aidera l'agrandissement de l'hôpital Ste. Thérèse de Shawinigan Falls.

Le Dr Fernand Hébert a été réélu président du comité provincial de la prévention de la tuberculose.

Le Dr J. L. Desrochers a été nommé chef du service de neurologie de l'hôpital Ste. Justine.

Le Dr C. Lefrançois, chirurgien de l'Hôtel-Dieu de Montréal, a été élu membre de la "Canadian Clinical Surgeons Association".

Le Dr Albert Guilbeault, chef du service de pédiatrie de l'hôpital Notre-Dame, est le délégué officiel du Canada au congrès du B.C.G. qui aura lieu prochainement à Paris. JEAN SAUCIER

General

Several member agencies of the **Community Chest of Greater Toronto** have been concerned for some time about the needs of the civilian handicapped in Toronto. They have, therefore, established a committee in the Division On Health with Miss M. Clarke, Director of Welfare Services of the Canadian National Institute for the Blind as Chairman, to study the problem. The first step was to find out, approximately, how many handicapped persons there are and what services are available for them. When these facts have been collected, they will be used as a basis for discussion of what further provision should and could be made in our community to improve and extend existing services for the civilian handicapped. The committee has started its work. The study is under the direction of Professor John S. Morgan of the School of Social Work, University of Toronto. Further information on the work of this Committee can be obtained from Mrs. Libbie C. Park, Secretary of the Division on Health, Welfare Council Department, 100 Adelaide St., West.

Scholarships amounting to \$4,500.00 have been made available to nine universities across Canada by Geoffrey H. Wood, president and general manager, G. H. Wood & Company, Toronto, prominent industrial sanitation firm.

Although Mr. Wood indicated that he wished the scholarships to be awarded to students in medical faculties with highest marks in year-ending examinations, actual award of the scholarships is largely left to the discretion of the universities' governing bodies. Majority of the scholarships will be presented to qualifying students by these universities.

The newly-organized Medical Panel of the **International Air Transport Association** (I.A.T.A.) held its first meeting in Toronto during the Nineteenth Annual Meeting of the Aero Medical Association, June 16, 17 and 18. Set up by I.A.T.A. to deal with all medical aspects of international airline operations, the Panel is composed of leading physicians nominated by I.A.T.A. member companies. Dr. Francis N. Kimball of New York City, long identified with aviation and now consulting medical officer to a number of United States airlines, is Acting Secretary.

The Chicago Medical Society Offers Postgraduate Courses.—The Chicago Medical Society is sponsoring two Postgraduate Courses in September to be given in Thorne Hall on the campus of Northwestern University Medical School, Chicago. The first Course in Hematology and Neurology will be given the week of September 13-18, 1948. The second course in Cardiovascular and Respiratory Diseases will be offered the week of September 20-25. Distinguished faculties of 58 from all over the United States will give the courses. There will be lectures, round tables, and intermissions which will give those taking the courses opportunity to meet and talk with the faculty. Both Courses are limited to 100 and are open to physicians in good standing in their local medical societies. For copy of program and application write Dr. Willard O. Thompson, Chairman, Committee on Postgraduate Medical Education, Chicago Medical Society, 30 North Michigan Avenue, Chicago 2.

BOOK REVIEWS

Primer of Cardiology. G. E. Burch, Associate Professor of Medicine, Tulane University School of Medicine, and P. Reaser, Instructor in Medicine, Tulane University School of Medicine. 272 pp., illust. \$4.50. Lea & Febiger, Philadelphia; Macmillan Co. of Canada, Toronto, 1947.

The many complexities of cardiology make the writing of a text-book on the subject a very difficult undertaking and it is probable, from the point of view of the student, that a really good text has yet to be written. Most books on the subject either suffer from poor arrangement or verbosity and there is a refreshing lack of both faults in the present volume. The general structure is excellent and especially praiseworthy is the lucid discussion of the mechanism and interpretation of murmurs. While this book warrants a high rating in its field it is somewhat marred by sections which give the impression of having been too rapidly composed and insufficiently proof-read. Correction of these faults in a subsequent edition would make this a truly excellent introduction to cardiology.

The Appendix. R. J. M. Love, Surgeon, Royal Northern, Mildmay Mission and Metropolitan Hospitals. 192 pp., illust. 12s. 6d. H. K. Lewis & Co. Ltd., London, 1947.

The main text of this monograph advocates the Ochsner-Sherren expectant treatment of an appendicular mass. In cases with constitutional symptoms, most surgeons will agree that this method of treatment should only be used on the threshold of the operating room by an experienced resident surgeon. However, the student and the practitioner will obtain a fair presentation of this subject. There are a few minor omissions: the transverse cosmetic skin incision is not mentioned, nor is the use of streptomycin included, as its introduction is too recent. The review is presented systematically and provides a concise and stimulating summary of this recurrent subject.

The Secret Instrument. W. Radcliffe. 99 pp., illust. 10s. 6d. Messrs. William Heinemann, London, W.C.1, 1947.

We are accustomed to hear of secret remedies: their name is legion in the history of medicine. But "secret instruments" are extremely rare. Perhaps the inventive age in surgery had to await the magic key of asepsis; perhaps it was so difficult to keep any instrument secret. In the case of the obstetric forceps however the conditions of obstetrical practice in the 16th century made it possible to conceal the instrument even whilst using it before spectators. It is clear that the obstetric forceps was invented by one of the Chamberlen family;

which one we do not know. It was then kept as a family secret for generations. What a prize of knowledge it was can only be realized when one conjures up what obstetric practice must have been like without any such mechanical aid. How the secret leaked out we do not know. Eventually one might expect that it would.

This book tells the story of the finding in an attic secret hiding place the original instruments used by Dr. Peter Chamberlen in the 17th century and is a most interesting chapter in the history of the obstetric forceps and of the men associated with their invention.

Roentgenology of the Gastro-intestinal Tract. J. T. Farrell, Clinical Professor of Radiology, Graduate School of Medicine, University of Pennsylvania. 271 pp., illust. \$7.50. Charles C. Thomas Publishing Company, Springfield, Illinois; Ryerson Press, Toronto, 1946.

This book has been written with many distinctive features. First the diseases of each part of the gastro-intestinal tract are discussed in a rigid order based on the topographic and etiologic classification outlined in "Standard Classified Nomenclature of Disease" published by the American Medical Association. Then the roentgenologic findings of each of the various organs are systematically studied on the basis of alteration of contour, motility and position. Every chapter ends with a summary which really represents a kind of general roentgenologic semeiology of the organ discussed therein. Where it is indicated the associated pathology which may be encountered with certain conditions is presented, for instance, the relation of lower lobe infection to oesophageal malignancy. The last two chapters on combined diseases of the stomach and intestine and on diseases of the small and large intestine combined are worthy of special mention. Illustrations are plentiful, well selected and of excellent technical quality. The book should be invaluable to the postgraduate student in roentgenology and to the gastro-enterologist.

Libido and Delusion. L. S. London, Washington, D.C. 259 pp., 2nd ed. \$3.50. Mental Therapy Publications, Washington, D.C., 1946.

The attitude of the author towards psychodynamics and therapy is clearly indicated in the first few lines of his preface—"In order to understand the mechanisms of the neuroses and psychoses it is essential to understand the mechanism of the libido. . . . It is the understanding of the libido which makes the operation of psychoanalysis possible and this is really an operation of the mind. The psychoanalyst must watch the libido in his technique during treatment just as the surgeon watches his incision under the scalpel." The author then, fortified by a brief description of the various theories of the libido, proceeds in Chapter I to present his conclusions as to the "composition, component parts, and traumatization of the libido".

The case material is brief and the analytic conclusions reached by the author are often lacking in clarity. His approach to the discussion of the libido in schizophrenia and paranoia, leads to some confusion.

The task set by the author is a pretentious one even when restricted to his main object of showing the interrelation between neuroses and psychoses and the mechanism of the libido.

Topics in Physical Chemistry. W. M. Clark, DeLamar Professor of Physiological Chemistry, The School of Medicine, Johns Hopkins University. 738 pp., illust. \$10.00. The Williams & Wilkins Co., Baltimore; The University of Toronto Press, Toronto, 1948.

Despite the fact that most medical schools require an elementary knowledge of the principles of physical chemistry, and many premedical students voluntarily acquire some training in this science, to most this subject remains an abstruse field. There is a prevalent

feeling that this is a discipline which has little to do with the practice of medicine, yet its subject matter is actually in constant use in the clinic. Realizing the constant reliance of biochemistry on first principles of physical chemistry, Dr. Clark has written a fascinating book designed specifically for the medical student—an entirely novel approach. He has chosen topics with an eye to their practical usefulness to the student of elementary biochemistry as well as to their clinical application. Conscious of the diverse academic backgrounds of medical students he begins his topics in an area which must be basic for all and devotes three excellent chapters to the measurement of weight, volume and density. While physical chemistry makes much use of formulae, Dr. Clark does not assume that his reader has any advanced mathematical training. It does not require any special equipment to follow the stepwise logical development of the argument in each case.

This book has a broad scope and must, indeed, be a useful supplement for any student whose interest in biochemistry extends beyond the lecture notes of an elementary course.

In Pursuit. M. Archdall, Editor, *The Medical Journal of Australia*. 120 pp.

An editor can keep an eye on his *obiter dicta* and when the time is ripe, he can gather them together, and there is a book. Dr. Archdall has done this and the result is a volume of essays. They are not too long, and they are of great variety: "On Laughter"; "Of Cabbages and Others"; "The Therapeutic Value of Reading"; "Social Security"; "Conversation, Criticism and Credit". These are only a few chosen from his collection at random. Dr. Archdall has humour and tolerance—one of his essays is on "Tolerance and Criticism"—and with his easy style of writing the book makes pleasant and stimulating reading. The subjects of his essays are not always of a strictly medical nature, but that if anything is an advantage: the point of view of the physician is still maintained. The majority of them also were written during the war by one who had served throughout the previous war, and, as is fitting, the thought of freedom in all its many aspects prevails throughout. The final and in some ways the best essay is on "Freedom and the Spirit of Man".

Victory Over Pain. A History of Anæsthesia. Victor Robinson, M.D. 338 pp., illust. \$3.50. Henry Schuman, New York, 1946.

"Victory over Pain" is written in such an interesting way that it is sure to appeal to the lay public as well as to members of the medical profession, and in particular to anæsthetists.

The book is well constructed giving a comprehensive study of the relief of pain over the ages from the times of ancient Greek mythology up to the present day. In doing this very good biographical descriptions are given not only of many of the men who administered the anæsthetics but also of those who made the discoveries of the various agents. There are good illustrations in the book, including a number of caricatures taken from non-medical periodicals showing various situations in which ether could be used to advantage.

The Chest. A Handbook of Roentgen Diagnosis. L. G. Rigler, Professor and Chief, Department of Radiology, University of Minnesota. 352 pp., illust. \$6.50. The Year Book Publishers Inc., Chicago, 1946.

This is one of a series of six handbooks of Roentgen diagnosis published about the same time. All of them are good but this one on the chest is to be recommended in particular because of its most practical form of presentation of a chapter of Roentgen diagnosis which is of considerable interest not only to the radiologist but to the medical profession at large. Practically all

of the most recent advances in chest radiology are discussed and demonstrated by abundant and excellent illustrations. For instance, the importance of unilateral emphysema in tumours and foreign bodies of the bronchi; the radiographic features of the various types of pneumonitis, the x-ray appearance of postoperative thorax and lung have received considerable emphasis. The application of tomographic studies to certain conditions of the chest is especially stressed. The correlation of fluoroscopic and radiographic observation in a number of chest conditions has been duly noted, with the importance of each procedure. Industrial diseases of the lungs and intra-thoracic tumours have also been given all the attention that they deserve. Radiologists, physiologists, chest surgeons, cardiologists, and all those who have something to do with chest surveys ought to have this handbook as a ready reference book.

Rheumatism and Soft Tissue Injuries. J. Cyriax, Physician-in-charge of the Physiotherapy Department, St. Thomas's Hospital, London, 410 pp., illust. \$9.50. Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, New York and London, 1946.

This text is an extensive discussion on the diagnosis and treatment of pain in the soft tissues of the body. The muscles, subcutaneous tissue, and ligaments are dealt with on a regional basis. The discussion of referred pain is quite interesting in its exposure of numerous fallacies found in the present day textbooks. Whether one agrees with the theories advanced by the author in every case does not matter as sufficient evidence is adduced to show the folly of dogmatism in this matter. The diagnostic significance of joint movements is dealt with in detail and very thoroughly. The weak point in the book is the lack of attention given to the use of heat and faradism which are of more value than the author admits. This book should be read by all those interested in the treatment of muscular pains and aches. Its clinical approach is a refreshing change from the statistics usually found in such texts.

Eleven Men and a Scalpel. Lieut.-Col. John Burwell Hillsman, M.D., Winnipeg.

The first issue of this book, review of which appeared in our May issue, was circulated privately in multigraph form. It has since been published by the Columbia Press, Winnipeg, and is on sale at the Hudson Bay Store, and Eaton's, Winnipeg; price \$2.50.

Handbook of Commonly Used Drugs. M. Pijoan, Director, The Chemical Foundation Laboratory, University of Colorado, Boulder, Colorado; and C. H. Yeager, Chief of the Medical Section, Health and Sanitation Division, Office of Inter-American Affairs, Washington, D.C. 198 pp. \$4.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1947.

The aim of this book, to provide reference material for drug usage where such is difficult to obtain, is a worthy one. Such a volume should be available in the more compact form such as is met with in various extra pharmacopœias. The list of drugs included in this book is not adequate and the therapeutic notes accompanying it are not complete enough to be satisfactory. The room occupied by structural formulae might well have been utilized for more extensive notes on groups of drugs lightly passed over. The section on tropical medicine and parasitology is the most useful but is disproportionately spaced. Either the proof reading or the typography has been very faulty. Errors are present on almost every page. It is apparent that this book does not accomplish the useful task it set out to perform.

Calcific Disease of the Aortic Valve. Howard T. Karsner and Simon Koletsky, Institute of Pathology, Western Reserve University and the University Hospitals of Cleveland. 111 pp. \$6.00 J. B. Lippincott Co., Montreal, 1947.

This monograph fills a great need among books on cardiovascular disease. The clinico-pathological correlation of aortic stenosis often presents a very significant problem in estimating prognosis. The authors, who are pathologists, deal very expertly with the problem of recognizing the clues to evidence of early inflammatory disease in valves that are calcified; in 196 of the 200 hearts studied, they found evidence of rheumatic disease. This now leaves no doubt that calcified disease of the aortic valve itself must be looked upon as a good clue to rheumatic aortic valvular disease. The first 12 pages of the monograph are devoted to an interesting and enlightening historical review of the subject. The statistical relationships of these 200 cases of calcified disease of the aortic valve are admirably dealt with in adequate detail. The clinical features include the fact that a systolic aortic murmur was heard in 108 of the 200 cases. In 54 cases the diastolic murmur of aortic insufficiency was heard. The absence of the second sound was detected in only 8 of the 200 cases, and in 6 of these the autopsy revealed very marked stenosis with rigid, practically immobile aortic cusps. These clinical observations were collected from the case histories and the observations had been made by numerous clinicians. It seems likely that the frequency of positive evidence of aortic stenosis and insufficiency would have been greater in these 200 cases if all the clinical observations had been made by one physician of the type specially interested in cardiovascular disease. This monograph will serve as a very useful reference for pathologists and clinicians alike.

Neuropathology in its Clinicopathologic Aspects. I. M. Scheinker, Assistant Professor of Medicine (Neurology) and Instructor in Neuropathology, University of Cincinnati, College of Medicine. 308 pp., illust. \$8.50. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto.

The 300 pages of this book are packed full of pertinent information. The majority of subjects of medical pathology that can be reasonably presented in any one thesis are covered concisely, adequately, and in a style that most readers will follow easily. The book is illustrated throughout in a very helpful manner. The number of illustrations and the spacing with regard to the text are excellent and go a long way in impressing the more uncommon conditions on the reader's mind. It is apparent that the author has had an intimate contact with the material he has presented and that he is very interested in the subject of his book. By leaving out of this discussion brain tumours, meningeal pathology, bacterial infections of the brain and lesions of the pituitary, the author has been able to give a comprehensive treatment to most of the common conditions of the central nervous system and many of the important but less common subjects of interest to the practicing neurologist. He has dealt at some length with the pathology of vascular disturbances and here has discussed very fully the possibility that many unexplained alterations of function and of structure are related to disturbances of blood flow and that the pathogenesis of these disturbances are explained by Ricker's concept of vasoparalysis, vasoparalysis and vasothrombosis. The subjects of demyelinating diseases and the encephalitides have been presented in an excellent manner. This book does not pretend to cover the whole field of neuropathology. In some places the author's opinions although stated convincingly are open to question, but in each case his thoughts are stimulating. This book is of value to practising neurologists, general pathologists and medical students who wish to have more books than the usual minimum library requirements.

Atlas of Bacteriology. R. C. Low, Bacteriology Department, University of Edinburgh; and T. C. Dodds, Laboratory Supervisor to the Department of Pathology, University of Edinburgh. 168 pp., illust. \$7.85. E. & S. Livingstone, Ltd., Edinburgh; The Macmillan Co. of Canada, Toronto, 1947.

This little volume, carrying 168 photographs of the common pathogenic bacteria, protozoa, spirochaetes, fungi and viruses, of which all but one are in colour, is of the greatest possible usefulness to the student of bacteriology, the bacteriological technician, and as a book of reference for bacteriological and clinical laboratories. Its subject matter consists of an introduction by the authors, followed by the 168 figures, each carrying beneath adequate information regarding the magnification and the salient points illustrated. The paper is of good quality and the colour photography is excellent. The book can be highly recommended to students and workers in the field of bacteriology.

Arthritis and Related Conditions. Edited by T. F. Bach, Associate in Medicine in the Graduate School of Medicine of the University of Pennsylvania, Philadelphia. 486 pp., illust. \$6.50. F. A. Davis Co., Philadelphia, 1947.

It has been said that rheumatic diseases have caused more illness, disability and invalidism than all other major chronic conditions combined. This statement alone is sufficient to justify writing a book discussing arthritis and its related conditions. The magnitude of the arthritis problem is tremendous, and the capacity of arthritis to maim has made it a medical, social and economical problem. Dr. Bach has written this book as an aid particularly to the general practitioner. In the early chapters, the author gives a very excellent approach to the subject, history and classification. The next chapters deal with the diagnostic principles, and he particularly emphasizes the importance of complete physical examination before using laboratory and roentgenologic aids in diagnosis. Rheumatoid arthritis is particularly well done, and his evaluation of the different forms of treatment is of great help to the practitioner. The chapter on back pain should be of interest to every person treating arthritis. Physical therapy and occupational therapy are dealt with in detail. Gold therapy in the treatment of chronic arthritis should be read by every practitioner before instituting treatment. Dr. Bach has provided critical evaluation of the various forms of treatment, giving proof of their value or failure. This book is to be recommended to the general practitioner and will not only arouse his interest in arthritis, but will be of great help in differential diagnosis and treatment.

Recent Advances in Sex and Reproductive Physiology. J. M. Robson, Reader in Pharmacology, Guy's Hospital Medical School. 336 pp., illust., 3rd ed. 21s. J. A. Churchill Ltd., London, W.1., 1947.

This is a very readable book, in which the author has presented the newer aspects of sex and reproductive physiology in a carefully considered, practical fashion. It will appeal as a valuable review to both student and practitioner alike. It includes recent information on the mode of action of sex hormones in the male and female in development, and reproduction; pituitary function in relation to the gonads; hormone standardization and determination of activity; ovulation and fertility, maintenance of pregnancy and initiation of parturition; and breast changes. His chapter on Clinical (Diagnostic and Therapeutic) Applications is particularly useful to the medical practitioner. It includes the known diagnostic tests for pregnancy and male fertility investigations. The therapeutic uses of the male and female sex hormones are well discussed and with admirable brevity. A conservative attitude is predominant and this is highly necessary in a medical world bursting with endocrine enthusiasm. The book is commendable.

Infant Nutrition. P. C. Jeans, Professor of Pædiatrics, College of Medicine, State University of Iowa, Iowa City; and W. M. Marriott, late Professor of Pædiatrics, Washington University School of Medicine, 516 pp., illust., 4th ed. \$7.00. C. V. Mosby Co., St. Louis; McAinsh & Co. Ltd., Toronto, 1947.

This book contains a mine of information on the nutritional requirements of the infant and the various common means of meeting these and also on normal digestion and its various abnormalities. In addition there is considerable material on allergy, prematurity, common infections which are associated with nutritional disturbances, deficiency diseases and miscellaneous techniques. The material is too detailed for the average student but would be of value to pædiatric interns and pædiatricians. Its helpfulness would be much enhanced if a complete bibliography were included. There is none at all at present. In some cases theories which have been generally discarded are still maintained and in one instance at least the author presents only his own view (*i.e.*, in regard to the optimum dosage of vitamin D).

Fatigue and Impairment in Man. S. H. Bartley, Professor of Research in the Visual Sciences, Dartmouth Eye Institute, Dartmouth Medical School; and E. Chute, Research Associate in the Visual Sciences, Dartmouth Eye Institute, Dartmouth Medical School. 429 pp., illust. \$5.50. McGraw-Hill Book Co., Inc., New York and London, 1947.

The authors first review the various views that have been put forward on fatigue. They then proceed to draw a distinction between fatigue and impairment. Impairment is related to a condition of tissue which can only be determined by physiological and biochemical methods. Fatigue is related to the organism as a whole and can only be described in terms such as are utilized by the psychologist. The possible relationship to fatigue or impairment of such considerations as nerve muscle activity, oxygen supply, hypoglycæmia, temperature variations, water and salt lack, metabolism and nutrition are reviewed. Similarly the literature and experimental work dealing with the psychological approach to the problem is covered. This volume brings together a great deal of hitherto scattered information on the large number of factors which may be operative in fatigue or impairment. It also indicates the need for further well controlled research in this field. The wider concept here put forward should be a stimulus to such research.

Gifford's Textbook of Ophthalmology. Francis H. Adler, Professor of Ophthalmology, University of Pennsylvania Medical School. 512 pp., illust., 4th ed. \$6.50. W. B. Saunders Co., Philadelphia and London; McAinsh & Co. Ltd., Toronto, 1947.

According to the preface this book is for the student in medicine and a reference book for the man in general practice. No general practitioner sees enough eye cases to keep ophthalmology in the forefront of his thinking, so that he must have a textbook to which he may refer readily for the knowledge he requires. This book can be highly recommended to the man who uses an ophthalmoscope, as well as the man who does not. The information is comprehensive, concise and lucid. Chapter 20 (Ocular Manifestations of General Diseases) gives a wealth of information so that the general man may find the ocular manifestations described relative to the general disease with which he is dealing. The twenty-first chapter on Operative Procedures might be considered irrelevant until we remember that many men are too far away from specialists to refer minor surgery, and that in the smaller centres the general man is asked to assist at eye operations. Finally, this book is very useful to the specialist in ophthalmology to keep on his desk for quick reference and to support his diagnosis and line of treatment to the doubting Thomas who must needs be re-assured by reference to the textbook.

Introduction to Gastro-Enterology. J. D. Lickley, Hon. Consulting Physician, Sick Children's Hospital, Newcastle-upon-Tyne. 143 pp., illust. \$2.15. John Wright & Sons Ltd., Bristol; The Macmillan Co. Ltd. of Canada, Toronto, 1947.

This little book is intended as a brief review of gastro-enterology for senior medical students and practitioners who may wish a quick refresher on this subject. The subject is dealt with in a popular, scientific manner; is well written and easy to read. The booklet is divided into four parts, the first of which deals with important anatomical facts and with the functional units of the tract. The second section describes the physiology of the alimentary tube in a practical way. The next division of the book is a résumé of physiopathology and emphasizes the rôle of the nervous controlling mechanism. The final section concerns some of the clinical conditions that may be encountered. The book is original and while, of necessity, much of it is elementary, yet it is an interesting book and covers many of the principles which form the basis for future study. It is not intended as a textbook.

Trichomonas Vaginalis and Trichomoniasis. R. E. Trussell, Associate in Hygiene and Preventive Medicine. 277 pp., illust. \$7.50. Charles C. Thomas, Springfield, Ill.; The Macmillan Co. of Canada, Toronto, 1947.

Written by an eminent authority on the subject, this book becomes the most complete monograph available. Because of his epoch making success in growing pure cultures of the trichomonas vaginalis, Dr. Trussell has succeeded in observing accurately the morphology, growth requirements, culture media, biochemical and antigenic properties, viability and the effect of physical and chemical agents, pathogenicity and classification of this species. Because of this knowledge his review of the available treatments, and his criticism merit the attention of all clinicians. The author clearly demonstrates by a thorough review of the literature that no therapeutic agent has been found which will eradicate the infection from all women who have vaginitis of this type. The natural habitat, pathogenicity, associated flora, sources of infection and methods of diagnosis are reviewed. He then lists in alphabetical order the preparations which have so far been used to eradicate the trichomonas vaginalis. In all, 185 such preparations are listed with a summary of the reported value of each. Obviously the great numbers of treatments proposed, and the contradictory evidence shown by their action *in vitro* emphasizes again the need for further study, such as has been encompassed in this book.

Surgical Disorders of the Chest. J. K. Donaldson, Diplomate American Board of Surgery. 485 pp., illust., 2nd ed. \$8.50. Lea & Febiger, Philadelphia; The Macmillan Co. of Canada, Toronto, 1947.

This edition contains all the features of the first with numerous revisions and additions. It covers the field of thoracic surgery in a compact manner with emphasis on the correlation of clinical pathology and diagnosis with treatment. Where conflicting opinions exist regarding treatment, an attempt is made to give the method of choice, according to the author's view, and the reasons thereof. New sections have been included on cardiac surgery and many references are made to experiences and advances made in thoracic surgery during World War II. The bibliography refers chiefly to key articles and reviews in each particular section and consequently is valuable for the student. This book will serve as an excellent reference text for medical students, interns and practitioners requiring a concise account of surgical treatment of thoracic disease.

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Visible Speech. R. K. Potter, Director of Transmission Research, Bell Telephone Laboratories; G. A. Kopp, Former Member of Technical Staff, Bell Telephone Laboratories, and H. C. Green, Former Member of Technical Staff, Bell Telephone Laboratories. 441 pp., illust. \$5.95. V. Van Nostrand Co., Inc., New York, 1947.

The authors have performed an important service in making available to all the story of visible speech. This should be of vital interest to the medical profession, physicists and anyone dealing with the hard of hearing and the deaf. Its purpose as stated in the preface "has been to present a comprehensive compilation of exacting knowledge that gives a basis of fact and terminology on which others can build and in the light of which they can fruitfully explore." The subject matter is interestingly arranged in three parts. Part one presents a description of the sound spectograph and the direct translator which enable the deaf to carry on conversation directly over the telephone, or to see radio speech. Part two, the lesson chapters, gives the fundamental lessons in reading visible speech. These are arranged in units according to the order of difficulty. Part three, discusses the application of visible speech from the standpoint of the deaf and hard of hearing and also from the standpoint of other specialized fields. A well organized discussion of the present known facts is presented. The book should prove interesting as well as challenging for anyone interested in the problems of the deaf.

BOOKS RECEIVED

Psychiatric Examination of the School Child. M. B. Hall, Joint Honorary Medical Director, Liverpool Psychiatric Clinic. 376 pp., illust. \$3.75. Edward Arnold & Co., London; Macmillan Co. of Canada, Toronto, 1947.

RH Factor. J. M. Hill and W. Dameshek, Editors. 192 pp. \$4.25. Grune & Stratton Inc., 381 Fourth Ave., New York 16, N.Y., 1948.

Textbook of Public Health. W. M. Frazer, Barrister-at-law, Gray's Inn, Medical Officer of Health, City and Port of Liverpool; and C. O. Stallybrass, Deputy Medical Officer of Health, City and Port of Liverpool. 582 pp., illust., 12th ed. \$7.50. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1948.

X-rays: Their Origin, Dosage, and Practical Application. W. E. Schall. 292 pp., illust., 6th ed., \$5.25. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1947.

Year Book of Obstetrics and Gynecology, 1947. Edited by J. P. Greenhill, Professor of Gynecology, Cook County Graduate School of Medicine. 590 pp., illust. \$3.75. The Year Book Publishers Inc., 304 South Dearborn Street, Chicago, 1948.

Aseptic Treatment of Wounds. Carl W. Walter, Assistant Professor of Surgery, Harvard University. 351 pp., illust. \$9.00. The Macmillan Co., New York, Toronto, 1948.

Basic Facts of Health Education. Selected Articles from the Ministry of Health Bulletins which have appeared in *The Pharmaceutical Journal*, 1944-1947. 193 pp. 7s. 6d. The Pharmaceutical Press, 17 Bloomsbury Square, W.C.1, London, England, 1948.

Bergley's Manual of Determinative Bacteriology. Robert S. Breed, New York State Experiment Station (Cornell University), Geneva, N.Y., E. G. D. Murray, McGill University, Montreal, and A. Parker Hitchens, University of Pennsylvania. 1529 pp., 6th ed. \$15.00. The Williams & Wilkins Co., Baltimore; The University of Toronto Press, Toronto, 1948.



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